General Specifications

Item	Specification
Lubricants and Sealants	
Premium Long-Life Grease XG-1-C, K or T	ESA-M1C75-B
Threadlock and Sealer E0AZ-19554-AA	WSK-M2G351-A5
Black Silicone Rubber D6AZ-19562-BA	ESB-M4G92-A
Pipe Sealant with Teflon® D8AZ-19554-A	ESR-M18P7-A
Motorcraft MERCON® Multi-Purpose (ATF) Transmission Fluid XT-2-QDX	MERCON®
Synchronizer	
Synchronizer blocking ring to conical face runout	0.5 mm (0.02 in)
End Play	
Input shaft end play	0.02286 mm (0.0009 in) - 0.0508 mm (0.002 in)
Countershaft cluster gear end play	0.0 mm (0.0 in) - 0.076 mm (0.003 in)
Output shaft end play	0.0012 mm (0.0005 in) - 0.100 mm (0.004 in)

Torque Specifications

Description	Nm	lb-ft	lb-in
Gearshift lever to extension housing bolt	23	13	—
Gear shift lever to gear shift stub shaft bolt	37	27	—
OSS to case bolt	10	—	89
Reverse idler gear bolt	27	20	—
Fifth/reverse lockout bolt	20	15	—
Clutch housing to transmission main case bolt	31	23	—
Extension housing to transmission main case bolt	31	23	—
Drain plug	23	17	—
Reversing lamp switch	37	27	—
Fill plug	17	13	—
Transmission to engine bolt	75	55	—
Engine plate to transmission bolt	27	20	—
Crossmember to frame bolt	41	30	—

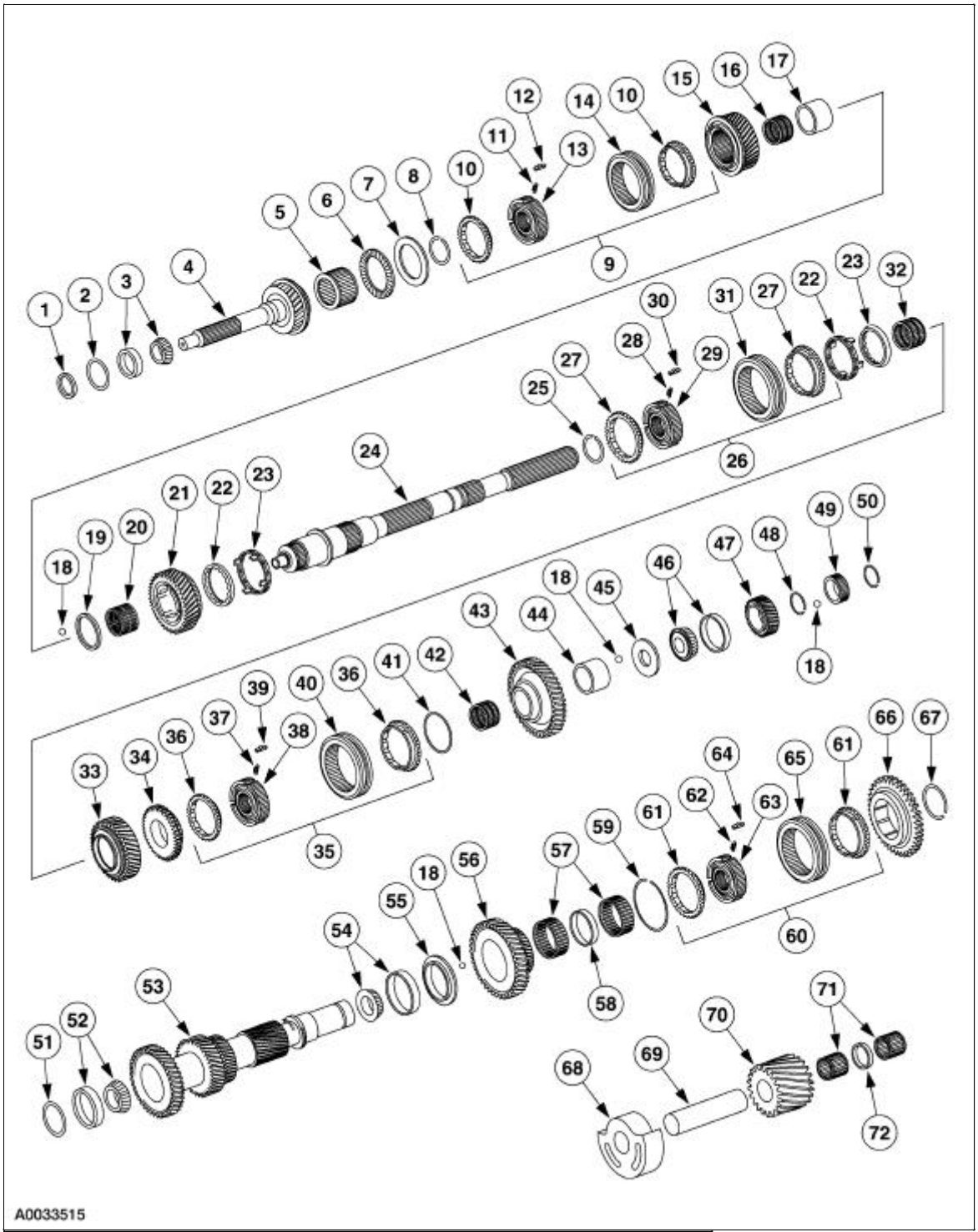
Crossmember to transmission support bolt	58	43	—
Driveshaft flange to pinion flange bolt	112	83	—

Manual Transmission

The TR3650 five-speed manual transmission features the following:

- The fifth speed gear functions as an overdrive gear.
- The forward gears are synchronized and helical cut.
- The reverse gear operates through a constant-mesh, fully synchronized system.
- The shift interlock system prevents the engagement of more than one gear.
- The countershaft is serviced as an assembly.
- An aluminum main case, extension housing and bell housing.

Transmission Internal Components — Disassembled View

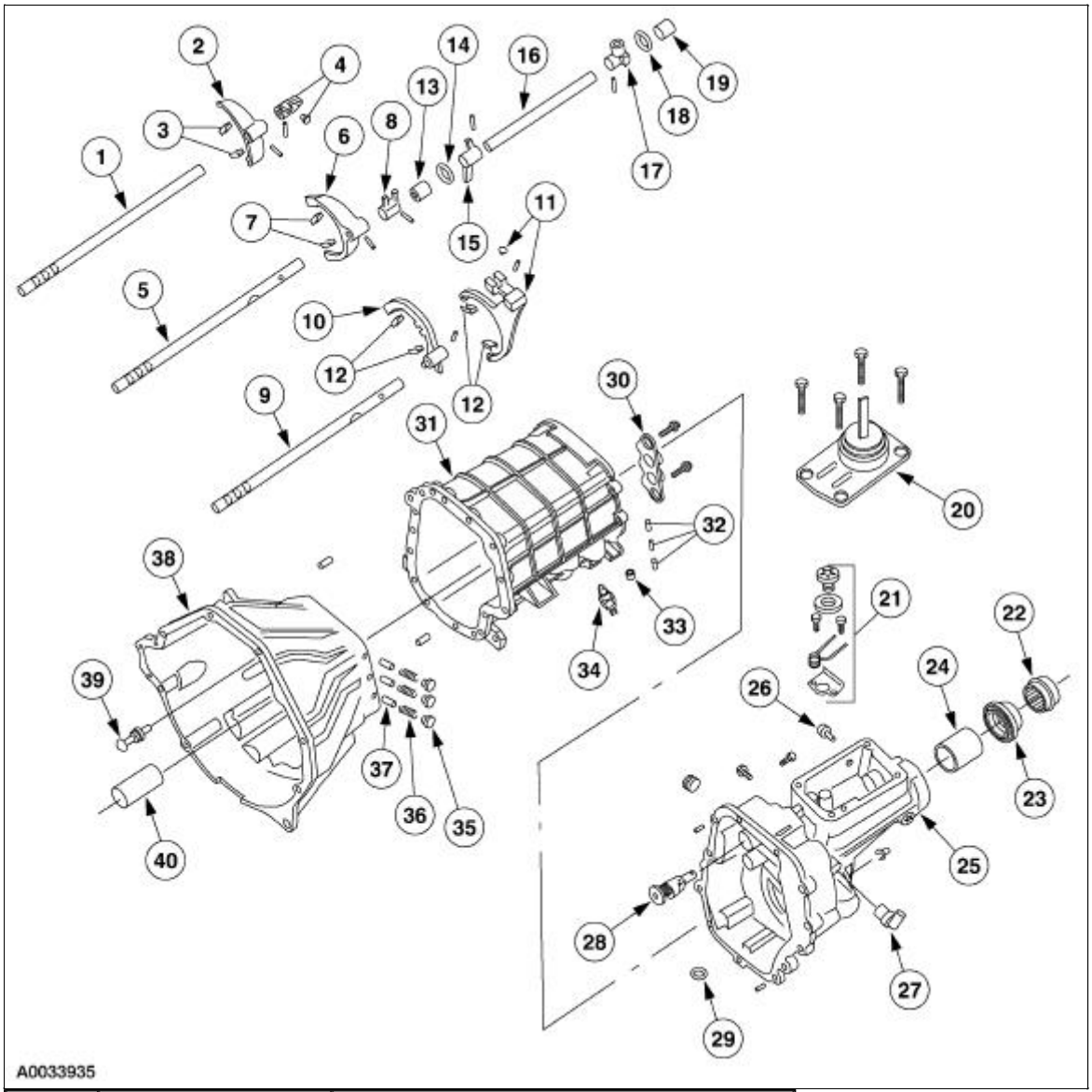


Item	Part Number	Description
1	7052	Input shaft seal
2	7L172	Shim
3	7025	Input shaft front bearing and cup
4	7017	Input shaft
5	7025	Input shaft pocket bearing
6	—	Input shaft thrust bearing
7	—	Input shaft thrust washer

8	7064	Retaining ring
9	7124	Third/fourth gear synchronizer assembly
10	7107	Third/fourth gear synchronizer blocking ring
11	—	Third/fourth gear synchronizer spring (part of 7124)
12	—	Third/fourth gear synchronizer insert (part of 7124)
13	—	Third/fourth gear synchronizer hub (part of 7124)
14	—	Third/fourth gear synchronizer sleeve (part of 7124)
15	7B340	Third gear
16	7B369	Third gear needle bearing
17	—	Third gear bushing
18	—	Check ball
19	—	Thrust washer
20	—	Second gear needle bearing
21	7102	Second gear
22	7175	First/second gear synchronizer inner cone
23	7174	First/second gear synchronizer outer cone
24	7061	Output shaft
25	—	Retaining ring
26	7124	First/second gear synchronizer assembly
27	7107	First/second gear synchronizer blocking ring
28	—	First/second gear synchronizer spring (part of 7124)
29	—	First/second gear synchronizer hub (part of 7124)
30	—	First/second gear synchronizer insert (part of 7124)
31	—	First/second gear synchronizer sleeve (part of 7124)
32	7127	First gear needle bearing
33	7100	First gear
34	—	Reverse clutch cone
35	7124	Reverse gear synchronizer assembly
36	7107	Reverse gear synchronizer blocking ring
37	—	Reverse gear synchronizer spring (part of 7124)
38	—	Reverse gear synchronizer hub (part of 7124)
39	—	Reverse gear synchronizer insert (part of 7124)
40	—	Reverse gear synchronizer sleeve (part of 7124)
41	—	Retaining ring
42	7N168	Reverse needle bearing
43	7C238	Reverse driven gear
44	—	Reverse gear bushing

45	—	Selector gate
46	7025	Mainshaft rear bearing and cup
47	7K316	Mainshaft fifth gear
48	—	Retaining ring
49	7H150	Output shaft speed (OSS) sensor
50	—	Retaining ring
51	7L172	Shim
52	7025	Countershaft front bearing and cup
53	7113	Countershaft
54	7025	Countershaft rear bearing and cup
55	—	Thrust bearing
56	7144	Countershaft fifth gear
57	—	Countershaft fifth gear needle bearing
58	—	Countershaft fifth gear bearing spacer
59	—	Retaining ring
60	7124	Fifth gear synchronizer assembly
61	7107	Fifth gear synchronizer blocking ring
62	—	Fifth gear synchronizer spring (part of 7124)
63	—	Fifth gear synchronizer hub (part of 7124)
64	—	Fifth gear synchronizer insert (part of 7124)
65	—	Fifth gear synchronizer sleeve (part of 7124)
66	—	Fifth gear clutch cone
67	—	Retaining ring
68	—	Reverse idler gear support
69	7140	Reverse idler gear shaft
70	7141	Reverse idler gear
71	7E169	Reverse idler gear needle bearing
72	—	Reverse idler gear bearing spacer

Transmission Case and Shift Components — Disassembled View



Item	Part Number	Description
1	7358	First/second shift rail
2	7239	First/second shift fork
3	7L082	Shift fork inserts
4	—	First/second shift finger
5	7241	Third/fourth shift rail
6	7230	Third/fourth shift fork
7	7L082	Shift fork inserts
8	—	Third/fourth shift finger
9	7242	Fifth/reverse shift rail
10	—	Reverse gear shift fork
11	—	Fifth gear shift fork
12	7L082	Shift fork inserts
13	—	Shift arm bearing
14	—	Spacer
15	—	Shift arm selector inhibitor

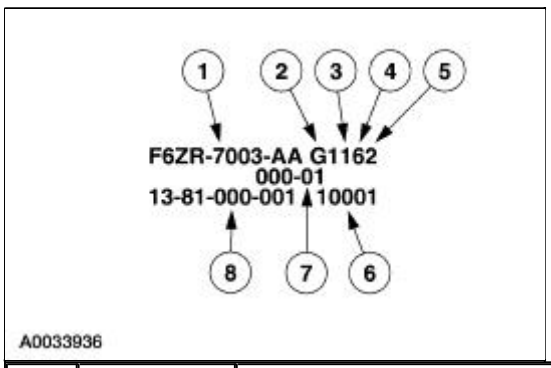
16	7240	Main shift rail
17	7F018	Gearshift offset lever
18	—	Spacer
19	—	Bearing
20	7210	Gearshift lever
21	—	Gearshift plate and spring
22	—	Shipping seal
23	7052	Output shaft seal
24	—	Extension housing bushing
25	7A039	Extension housing
26	7034	Vent
27	—	Vehicle speed sensor (VSS)
28	—	Fifth/reverse gear lockout
29	7L027	Magnet
30	7K201	Shift interlock plate
31	7005	Transmission main case
32	—	Interlock pins
33	7A010	Drain plug
34	15520	Reverse lamp switch
35	—	Detent plug
36	—	Detent spring
37	—	Detent
38	6392	Clutch housing
39	7B602	Ball stud
40	—	Bearing

Transmission Identification

The transmission identification tag is located under the lower bolt that retains the extension housing to the main case.

The five speed overdrive (TR3650) transmission is available for the Mustang 4.6L (2V).

Transmission Identification



	Part	

Item	Number	Description
1	—	Transmission assembly number
2	—	Build date code—month
3	—	Build date code—day
4	—	Build date code—year
5	—	Shift number
6	—	Serial number
7	—	Service repair code
8	—	Identification number located on left lower side of transmission case

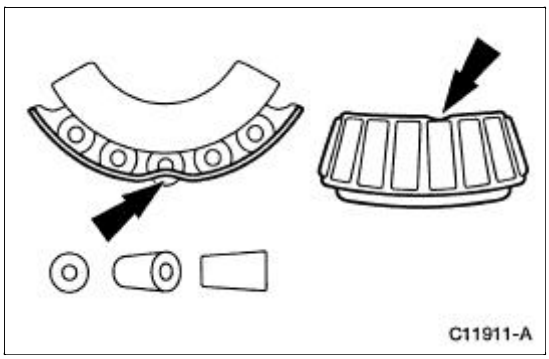
Manual Transmission

Refer to Section 308-00 .

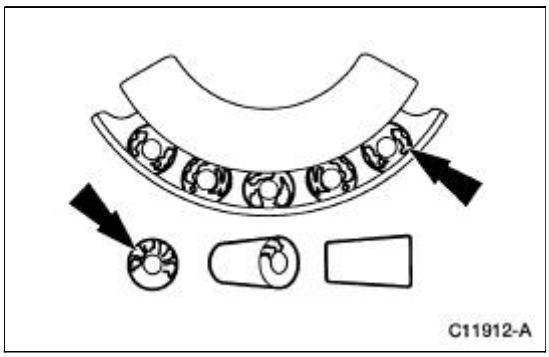
Bearings —Inspection

NOTE: If any of the following conditions exist, install a new bearing.

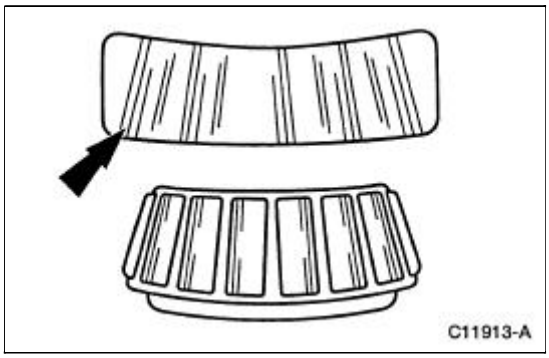
1. Inspect the bearing for a bent cage.



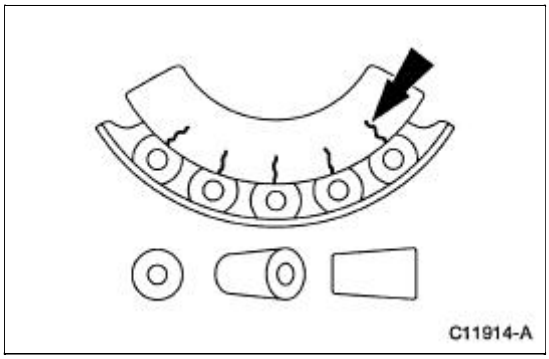
2. Inspect bearings for galling (metal smears on roller ends).
   - Galling is caused by overheating, poor lubrication or an overload situation.
   - If galling is found, install a new bearing and inspect the seals.



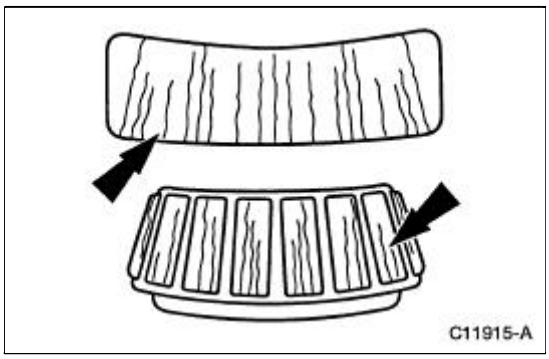
3. Inspect the bearing for brinelling (surface indentations in the raceway).



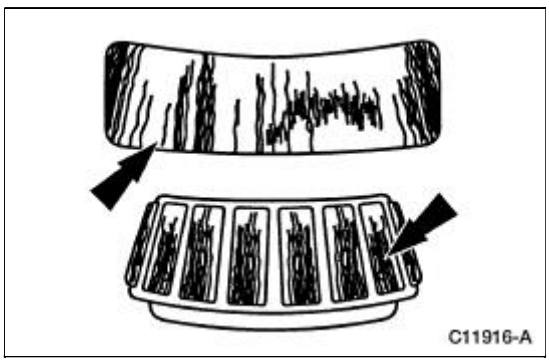
4. Inspect bearing for cracked inner race.



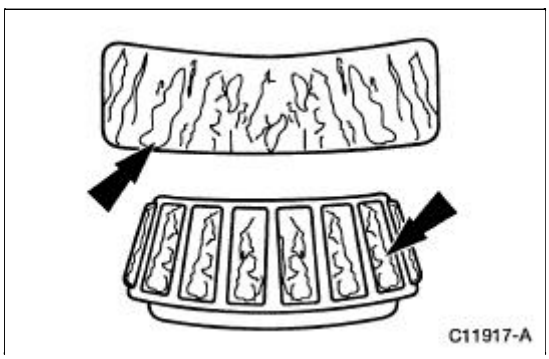
5. Inspect the bearing and raceway for etching.
    - If etching is present, inspect the seals.



6. Inspect the bearing for heat discoloration (dark blue).
    - If heat discoloration is evident, check the bearing and race for loss of temper. Draw a file across the component. If the file cuts the metal, there is a loss of temper.

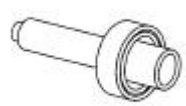
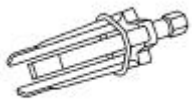


7. Inspect the bearing for fatigue spalling (metal flaking).



Seal

Special Tool(s)

 ST2199-A	Installer, Transmission Extension Housing Oil Seal 308-227 (T94P-7657-A)
ST1185-A	Slide Hammer 100-001 (T50T-100-A)
 ST2200-A	Remover, Bushing 307-001 (TOOL-1175-AC) or Equivalent

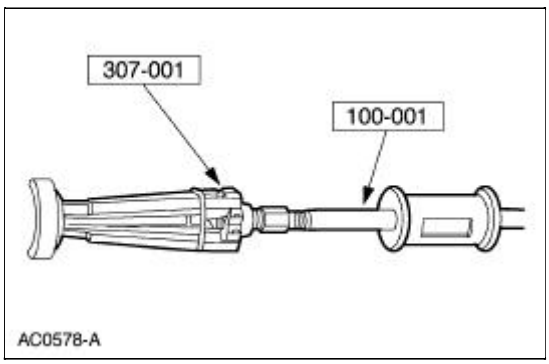
Removal

1. With the vehicle in NEUTRAL, raise and support the vehicle. For additional information, refer to Section 100-02 .

2. **CAUTION: Index-mark the driveshaft flange and pinion flange, and the driveshaft slip yoke and transmission output shaft.**

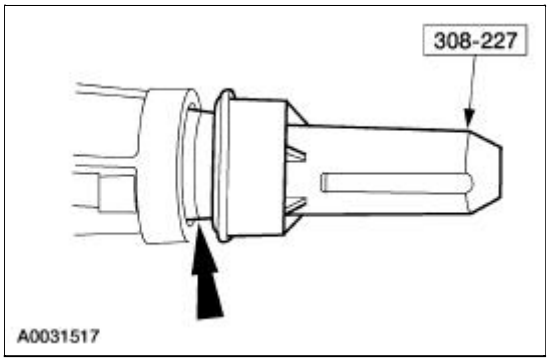
   Remove the driveshaft. For additional information, refer to Section 205-01 .

3. Using the special tools, remove the extension housing fluid seal.



Installation

1. Using the special tool, install the extension housing fluid seal.



2. **CAUTION: Align the index marks.**

   Install the driveshaft. For additional information, refer to Section 205-01 .

3. Check the transmission fluid level, add fluid if necessary.

4. Lower the vehicle.

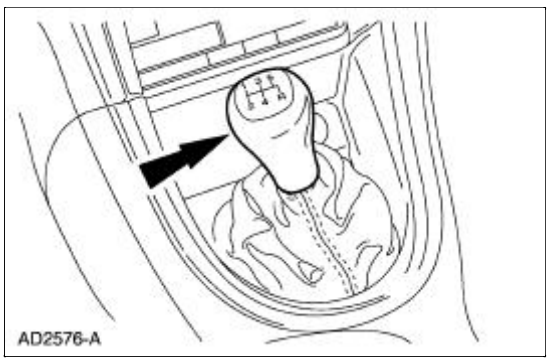
Gearshift Lever and Boot

Material

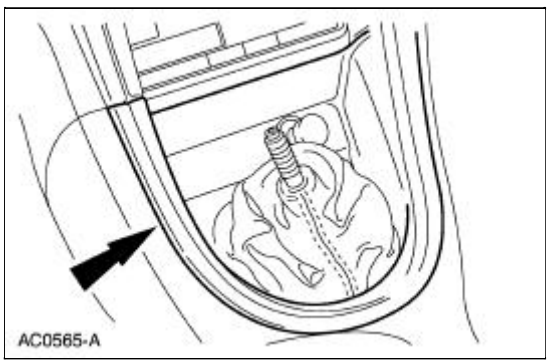
Item	Specification
Clear Silicone Rubber D6AZ-19562-AA or equivalent	ESB-M4G92-A

Removal and Installation

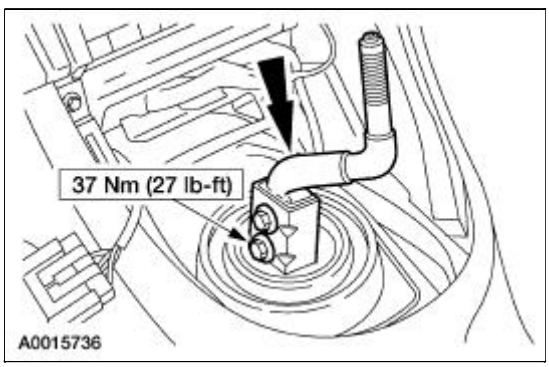
1. Remove the gearshift lever knob.



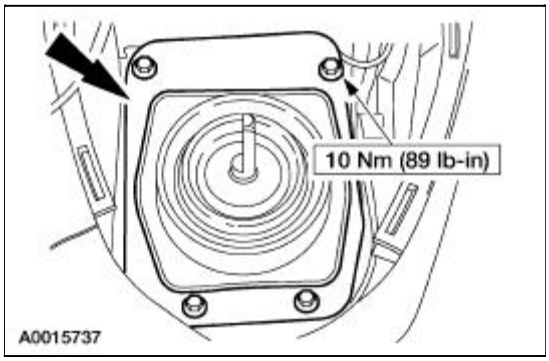
2. Remove the console panel gearshift plate. Lift the gearshift lever boot over the gearshift lever.



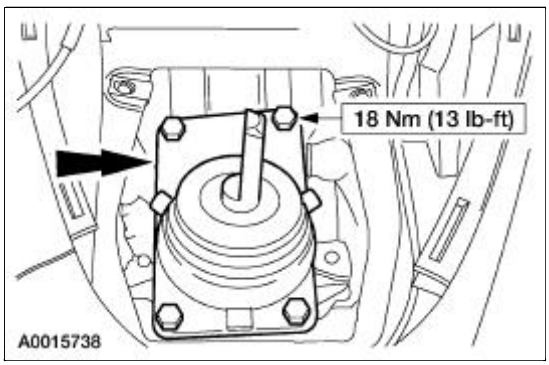
3. Remove the bolts and the shift lever.



4. Remove the screws and the inner shifter boot.



5. Remove the bolts and the gearshift lever.



6. Remove the gearshift lever boot.

7. **CAUTION: Cover the opening in the extension housing to prevent contamination.**

   Clean the gearshift lever mounting surfaces.

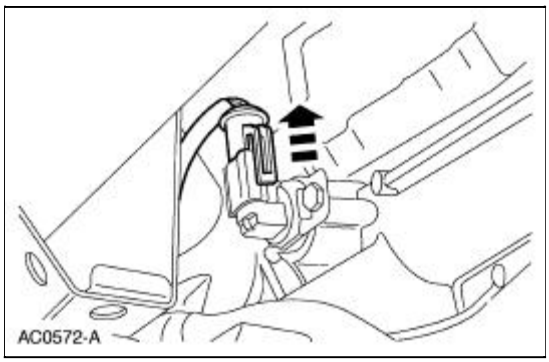
8. To install, reverse the removal procedure.
   - Apply a 3.2-mm (1/8-in) bead of silicone rubber to the sealing surface on the gearshift lever.

Output Shaft Speed (OSS) Sensor

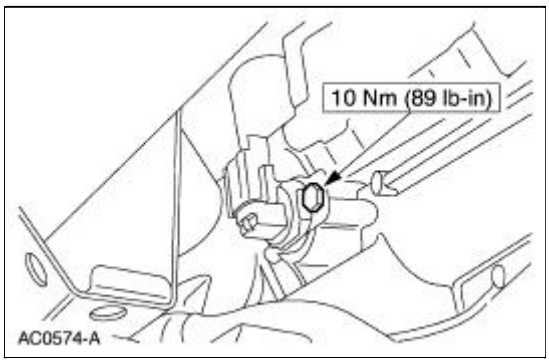
Removal and Installation

1. With the vehicle in NEUTRAL, raise and support the vehicle. For additional information, refer to Section 100-02 .

2. Disconnect the electrical connector.



3. Remove the output shaft speed (OSS) sensor.

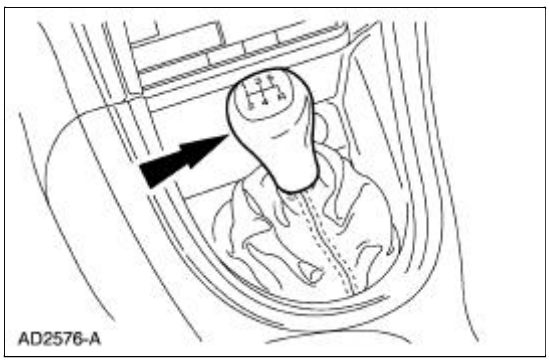


4. To install, reverse the removal procedure.

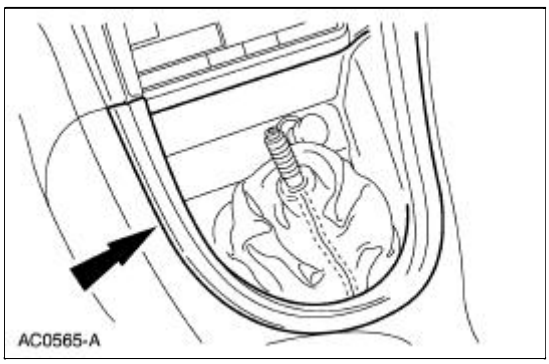
Transmission

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01 .

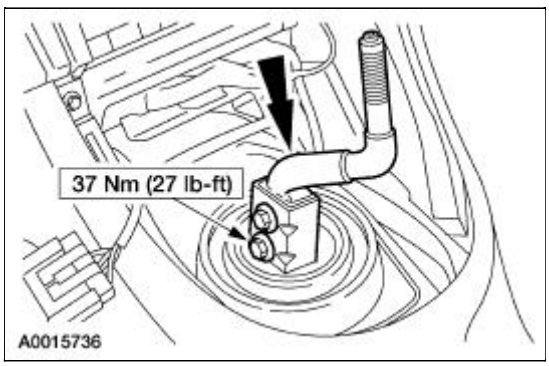
2. Remove the gearshift lever knob.



3. Remove the console panel gearshift plate. Lift the gearshift lever boot over the gearshift lever.



4. Remove the bolts and the shift lever.

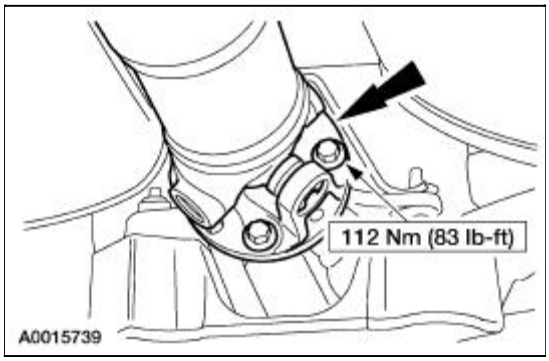


5. With the vehicle in NEUTRAL, raise and support the vehicle. For additional information, refer to Section 100-02 .

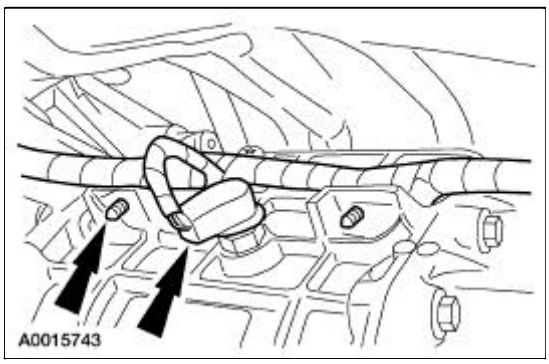
6. Remove the dual converter H-pipe. For additional information, refer to Section 309-00 .

7. **CAUTION: Index-mark the driveshaft flange and pinion flange, and the driveshaft slip yoke and transmission output shaft.**

Remove the driveshaft. For additional information, refer to Section 205-01 .

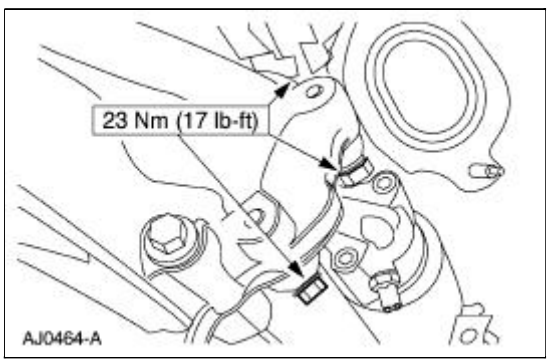


8. Disconnect the reversing lamp switch electrical connector. Disconnect the wiring harness from the transmission.

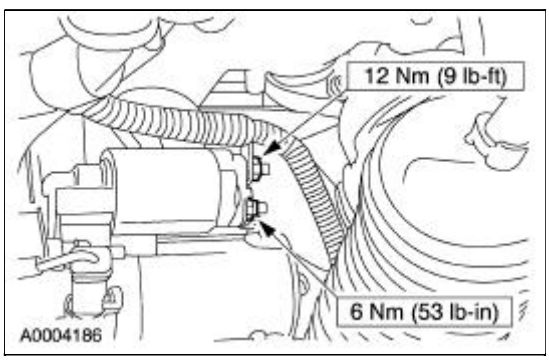


9. Remove the starter motor. For additional information, refer to Section 303-06 .

10. Remove the bolts.

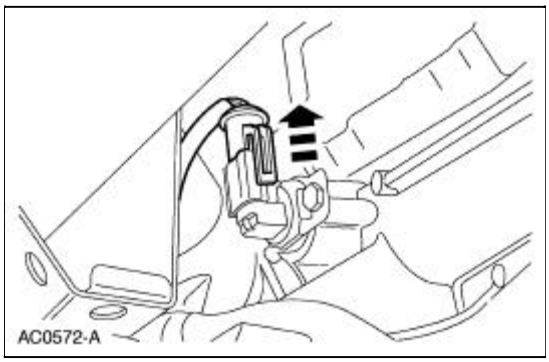


11. Remove the starter solenoid nuts and position the wires aside.

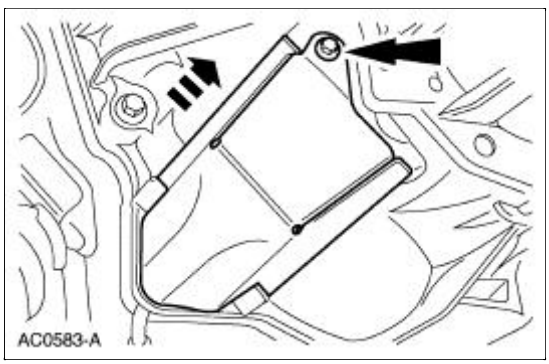


12. Remove the starter motor.

13. Disconnect the OSS sensor electrical connector. Disconnect the wiring harness from the transmission.

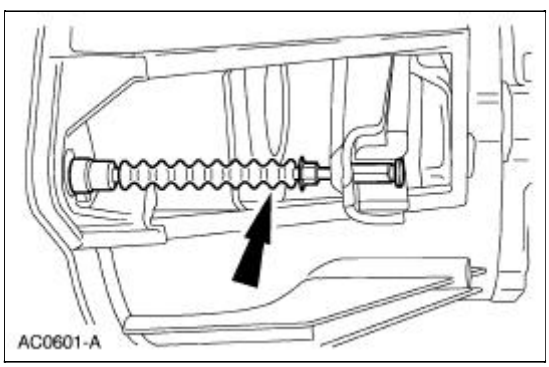


14. Remove the bolt and the clutch release lever cover.

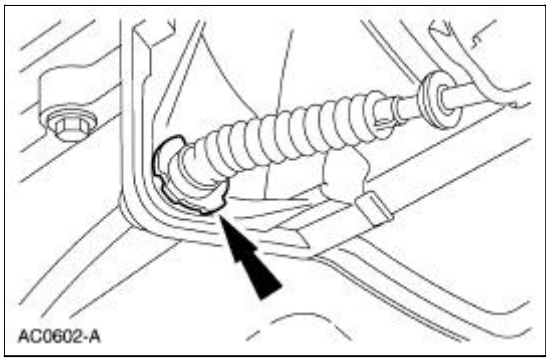


15. **CAUTION: To prevent component damage, do not depress the clutch pedal with the transmission removed.**

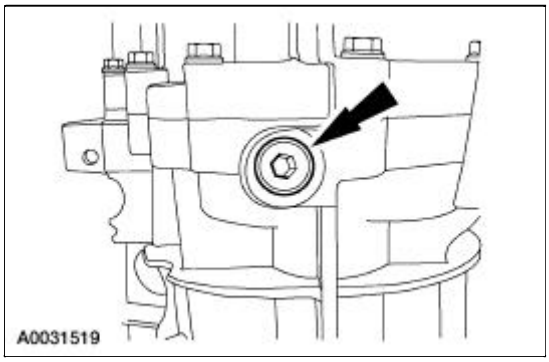
    Disengage the clutch release cable from the clutch release fork.



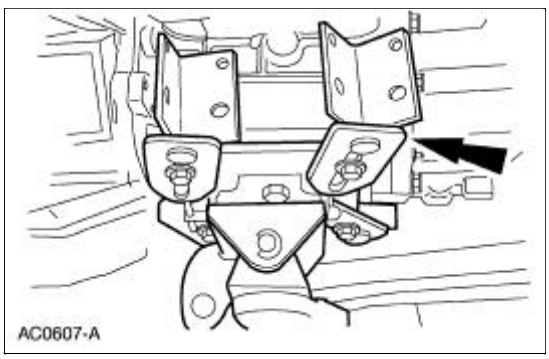
16. Remove the clutch cable retainer and remove the clutch cable from the transmission.



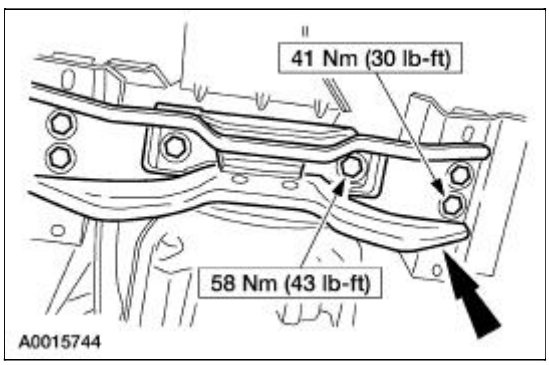
17. If transmission disassembly is necessary, drain the transmission fluid.



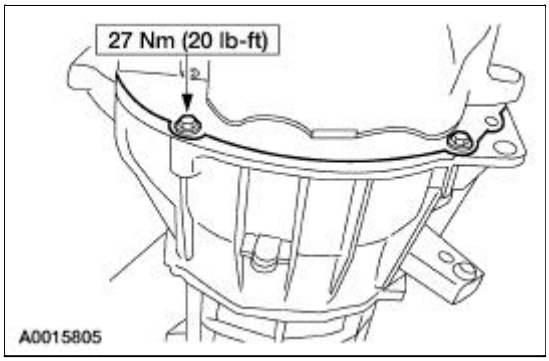
18. Position a transmission jack and support the transmission.



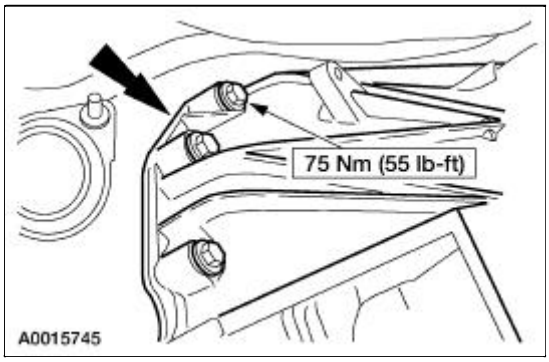
19. Remove the bolts and the transmission crossmember.



20. Remove the bolts.

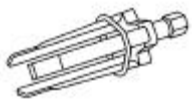


21. Lower the transmission and remove the five bolts.



Transmission

Special Tool(s)

ST1305-A	Remover, Mainshaft Bearing 308-058 (T77J-7025-H)
ST1304-A	Screw, Bearing Removal tube 308-092 (T84T-7025-B)
ST1186-A	Holding Fixture, Transmission 307-003 (T57L-500-B)
 ST2200-A	Remover, Bushing 307-001 (TOOL-1175-AC)
ST1303-A	Remover/Installer, Bearing Tube 308-024 (T75L-7025-B)

Disassembly

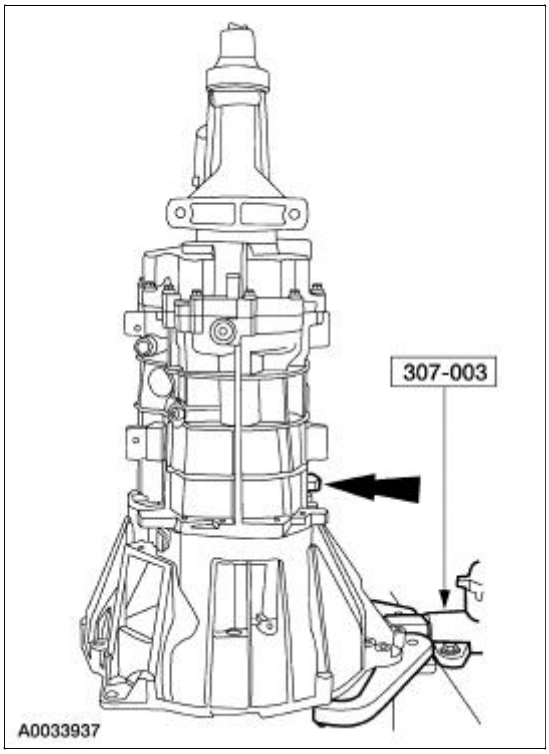
NOTE: During disassembly, if any roll pins, retaining rings or bearings are removed, install new components. Install bearings and bearing cups as a set.

1. Remove the clutch release hub and bearing and the clutch release lever. For additional information, refer to Section 308-01 .

2. **WARNING: Make sure protective eye wear is in place.**

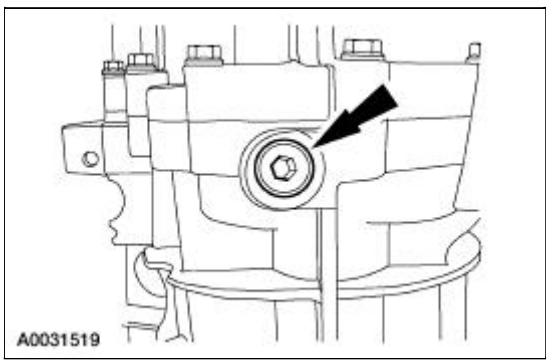
   Clean the transmission exterior with solvent and dry with compressed air. During disassembly, clean all components with solvent and dry with compressed air.

3. Attach the transmission to the special tool.

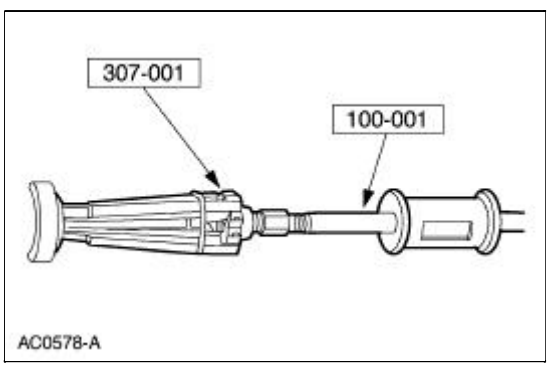


4. **NOTE:** Position a drain pan under the transmission.

   Remove the case plug, then rotate the transmission to a horizontal position.



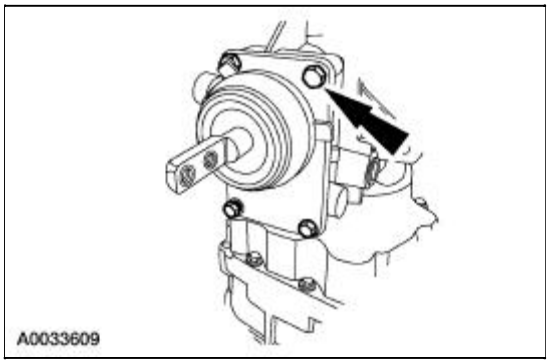
5. Using the special tools, remove the extension housing fluid seal.



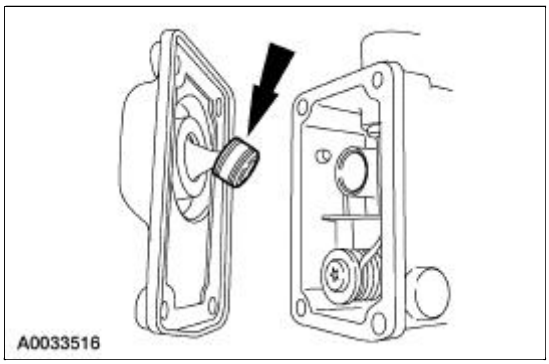
6. **NOTE:** Rotate the transmission to a vertical position.

   NOTE: Position the gearshift lever in NEUTRAL.

Remove the bolts and the gearshift lever.

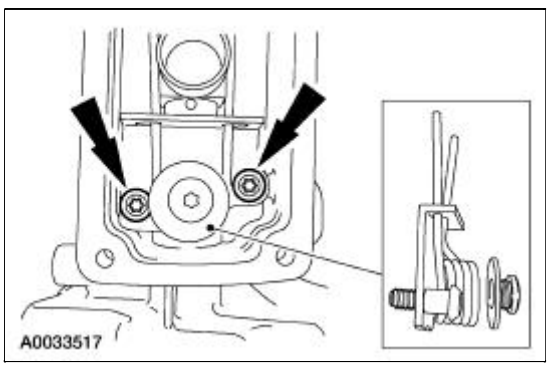


7. Inspect the gearshift offset lever insert and O-ring for wear or damage. Install a new insert as necessary.

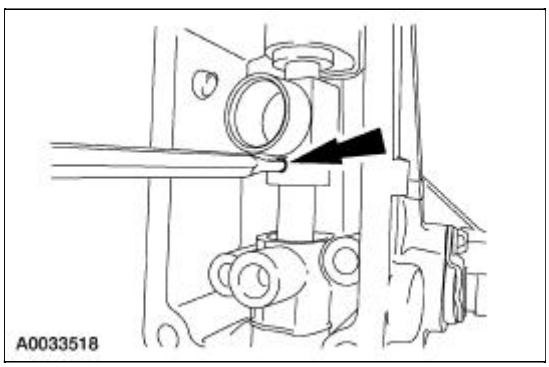


8. **NOTE:** If necessary, remove the spring and plate for disassembly.

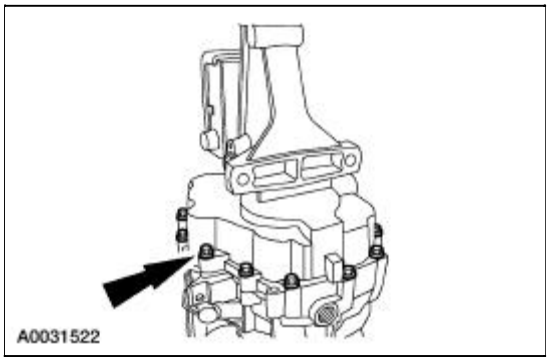
   Remove the bolts and the shift spring and plate.



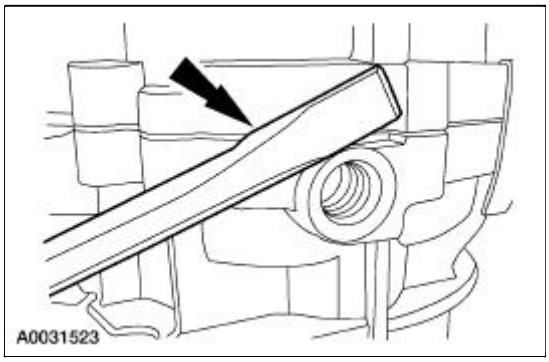
9. Using a 5/32-inch drift and a hammer, drive the split pin downward.



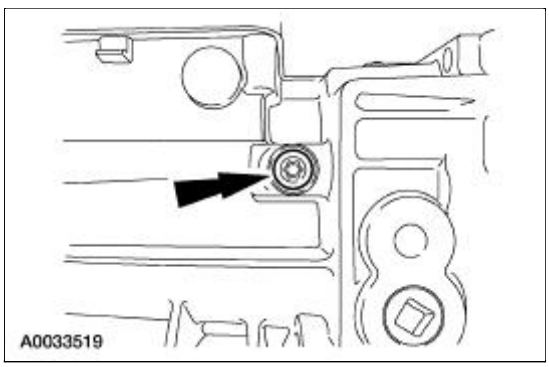
10. Remove the 12 bolts.



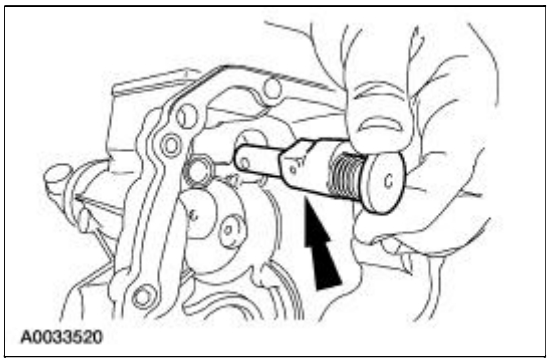
11. Using a flat-blade screwdriver, separate the extension housing, then remove the gearshift offset lever from the transmission case.
    - Remove and discard the split pin from the gearshift offset lever during removal.



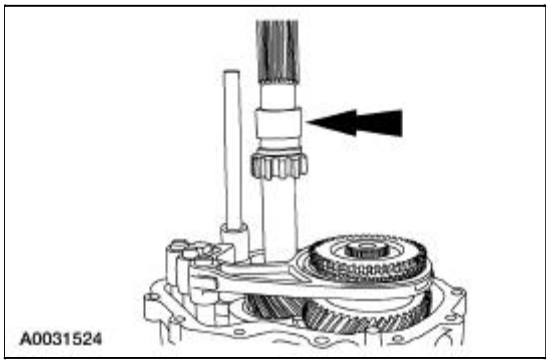
12. Remove the fifth/reverse gear lockout bolt.



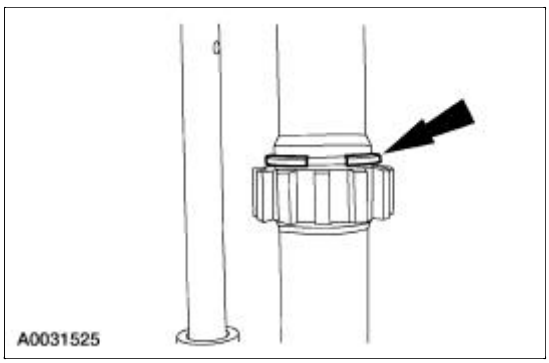
13. Remove the fifth/reverse gear lockout.



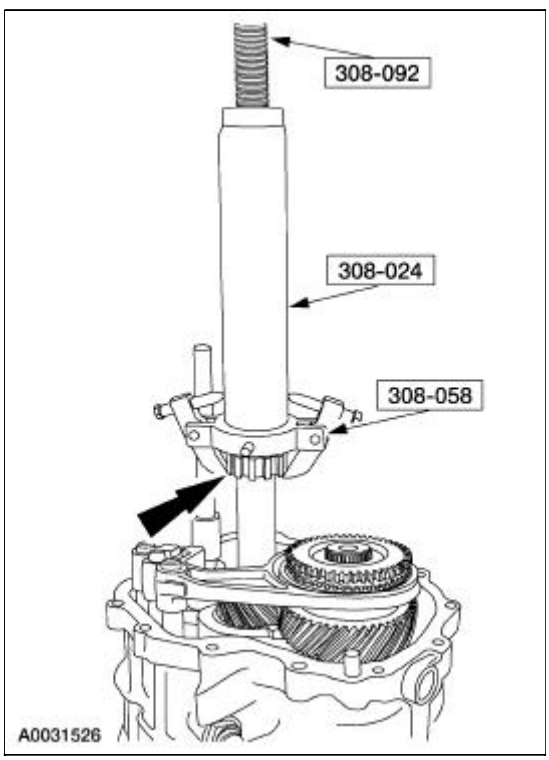
14. Remove the shipping seal.



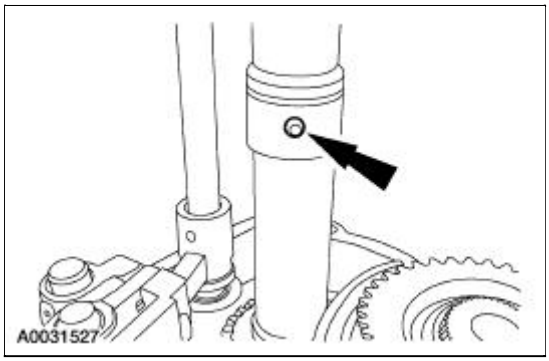
15. Remove the OSS sensor tone wheel retaining ring.



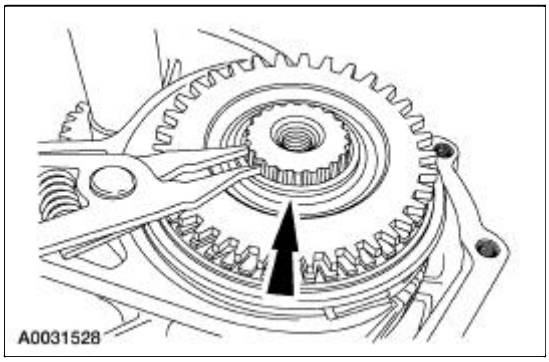
16. Using the special tools, remove the OSS sensor tone wheel.



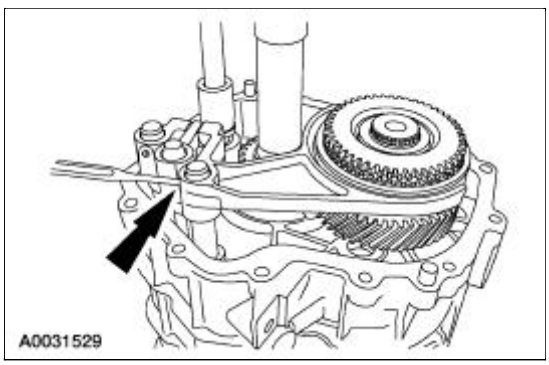
17. Remove the OSS sensor tone wheel check ball.



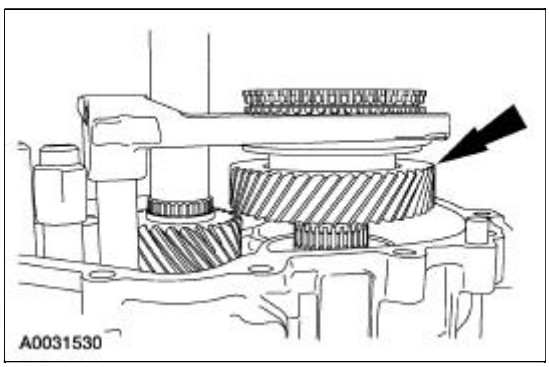
18. Remove and discard the fifth gear synchronizer retaining ring.



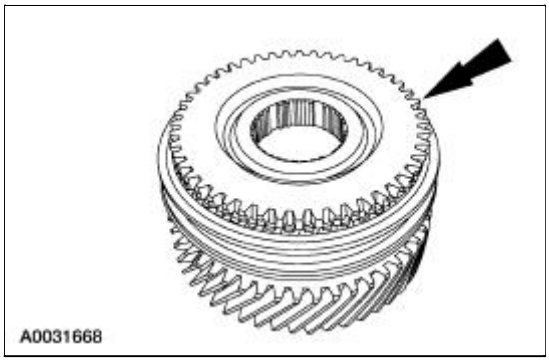
19. Using a 5/32-inch drift and a hammer, remove and discard the pin from the fifth gear shift fork.



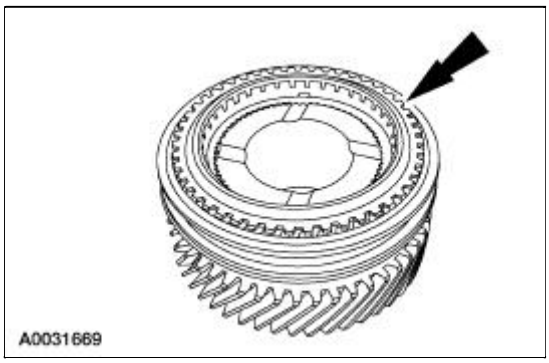
20. Remove the fifth gear shift fork, synchronizer assembly, synchronizer cone and the fifth gear as an assembly.



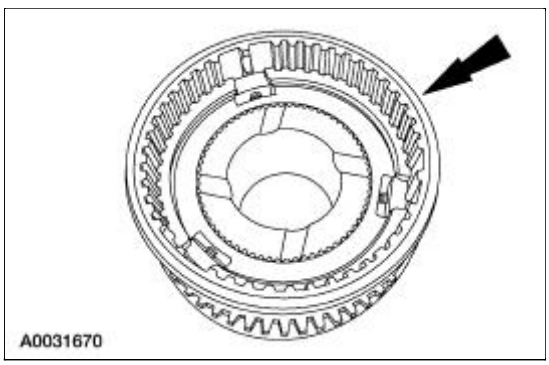
21. Remove the fifth gear clutch cone.



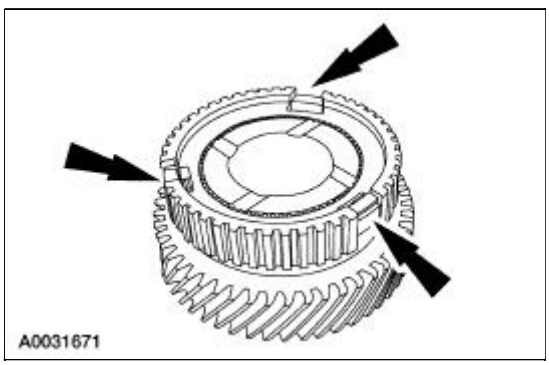
22. Remove the fifth gear synchronizer blocking ring.
    - Inspect the blocking ring for wear or damage. Install new blocking rings as necessary.



23. Remove the fifth gear synchronizer sleeve from the synchronizer hub.

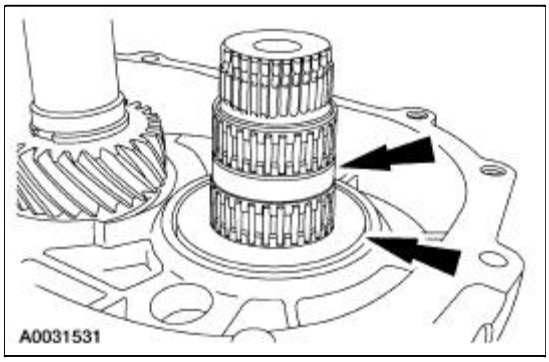


24. Remove the synchronizer inserts and the springs.

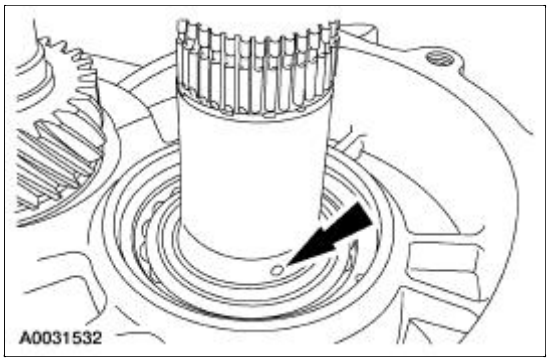


25. Remove the needle bearings and the thrust washer.
    - The fifth gear needle bearing is three separate pieces: bearing, spacer, bearing

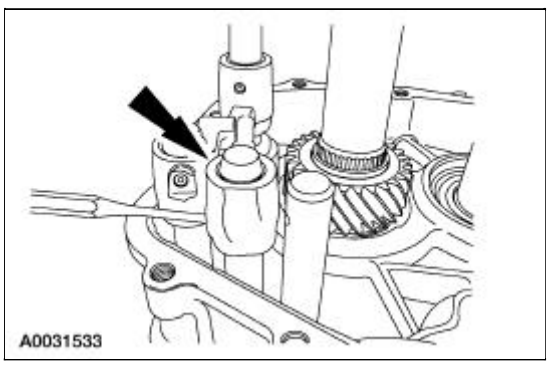
- Inspect the needle bearing for wear or damage. Install new bearings as necessary.



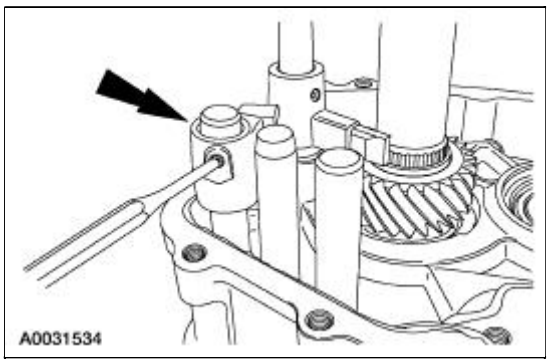
26. Remove the check ball.



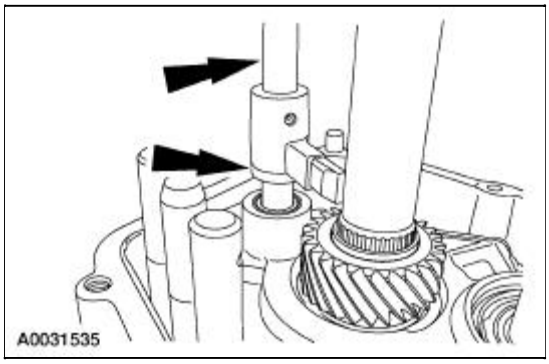
27. Using a 5/32-inch drift and a hammer, drive out the split pin, then remove the third/fourth shift finger. Discard the split pin.



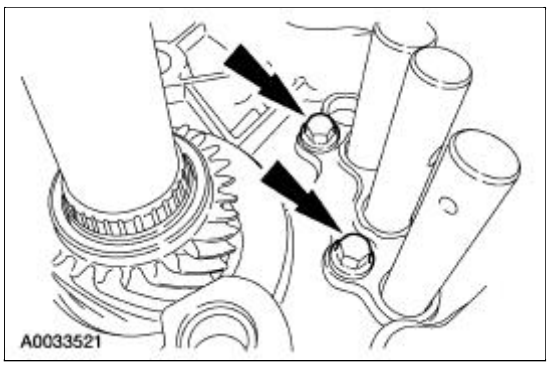
28. Using a 5/32-inch drift and a hammer, drive out the split pin, then remove the first/second shift finger. Discard the split pin.



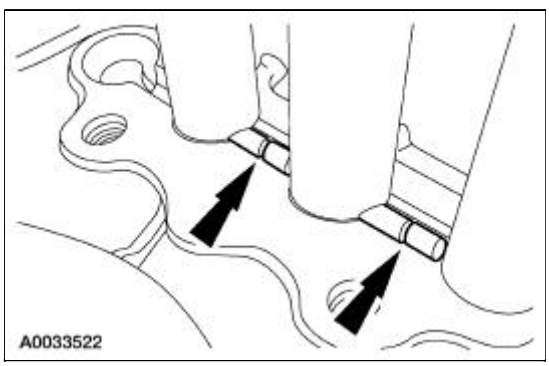
29. Remove the main shift rail and the plastic spacer.



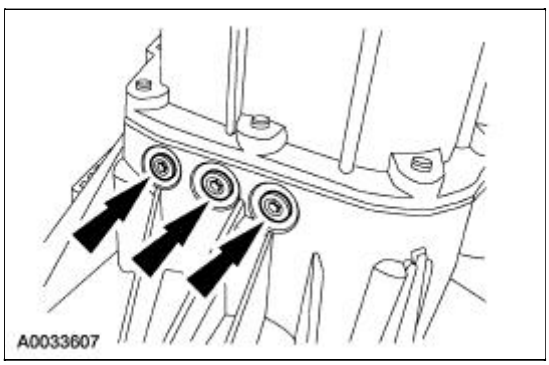
30. Remove the bolts and the shift interlock plate.

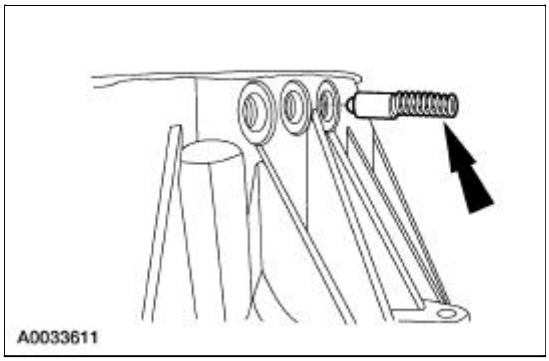


31. Using a magnet, remove the interlock pins.
    - One lock pin in the center rail, two between the rails.



32. Remove the three detent plugs, springs and the detents.

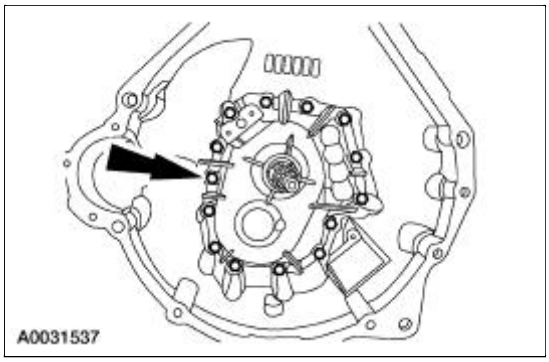




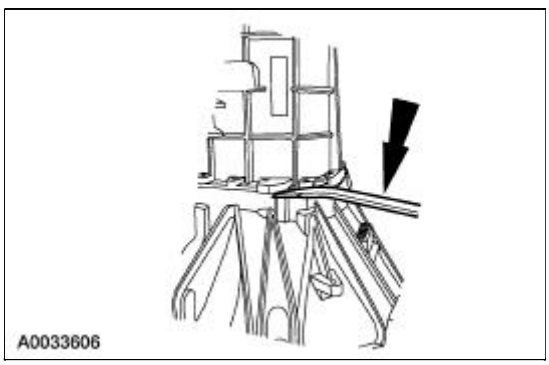
33. **CAUTION: Do not remove all the bolts while in the horizontal position.**

    Remove the bolts.

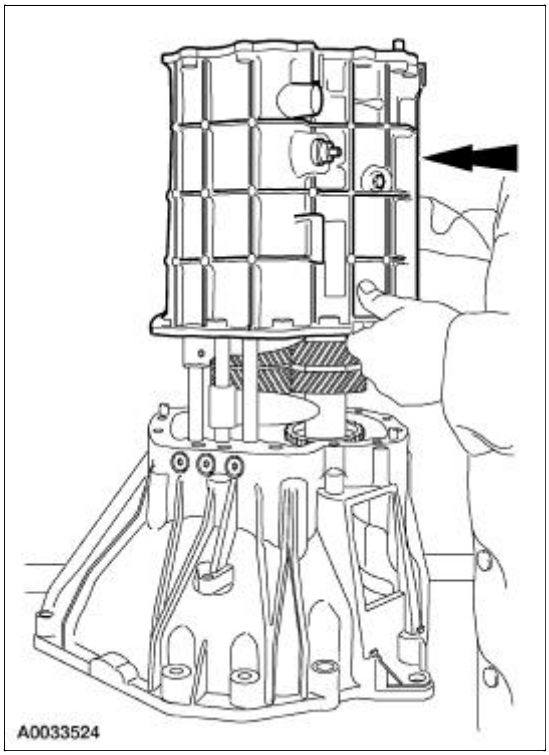
    - Rotate the transmission to a horizontal position. Remove 12 bolts, leaving two opposing bolts in. Rotate the transmission to a vertical position, then remove the remaining two bolts.



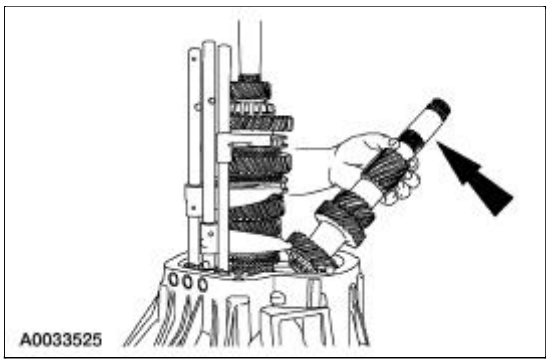
34. Carefully pry the clutch housing from the transmission main case.



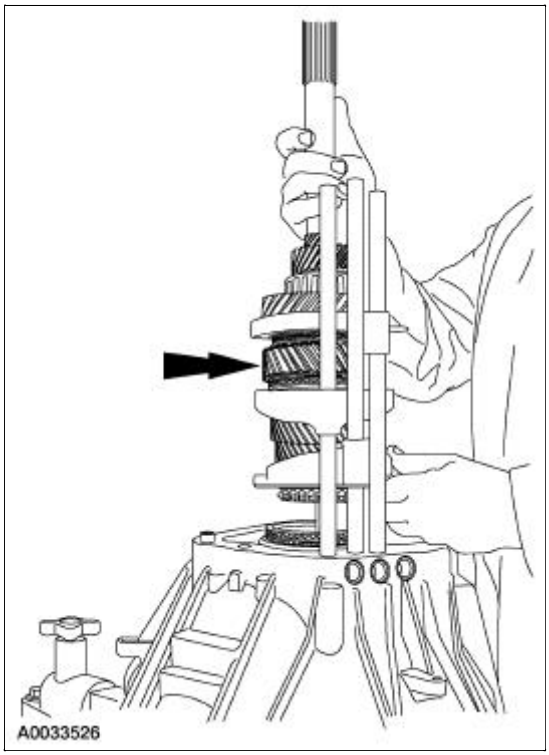
35. Remove the transmission main case from the clutch housing.



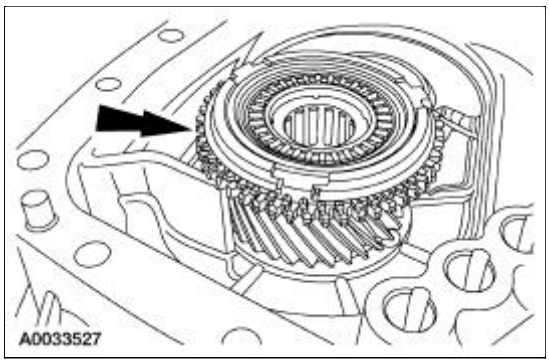
36. Lift the mainshaft 13 mm (0.50 in) upward, tilt the countershaft outward and remove the countershaft.



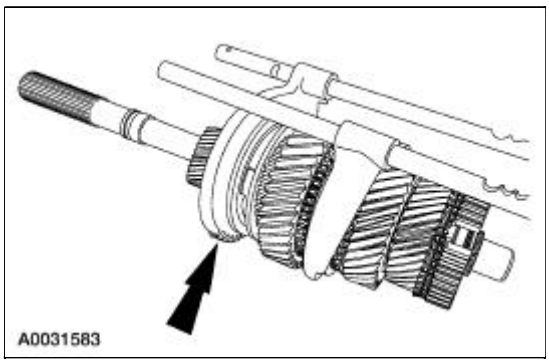
37. Remove the mainshaft and shift assembly.



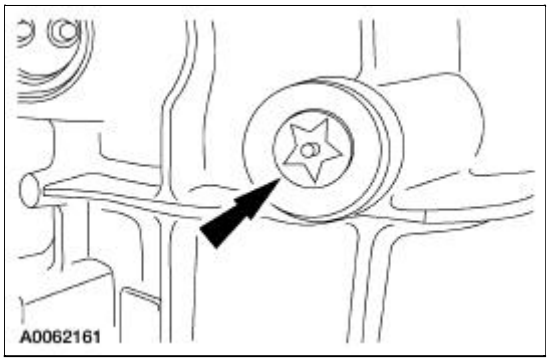
38. Remove the input shaft. For input shaft disassembly, refer to Input Shaft and Bearing in this section.



39. Remove the shift rails and shift forks from the main shaft. For gearshift rail and fork disassembly, refer to Gearshift Rail and Fork in this section.

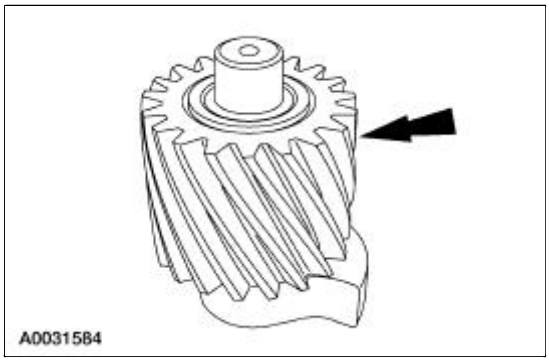


40. Remove the reverse idler shaft bolt. Remove and discard the seal.

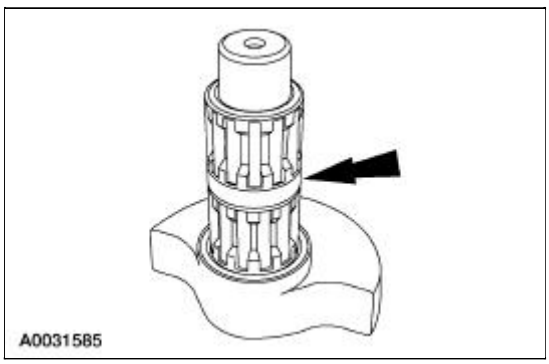


41. Remove the reverse idler gear assembly.

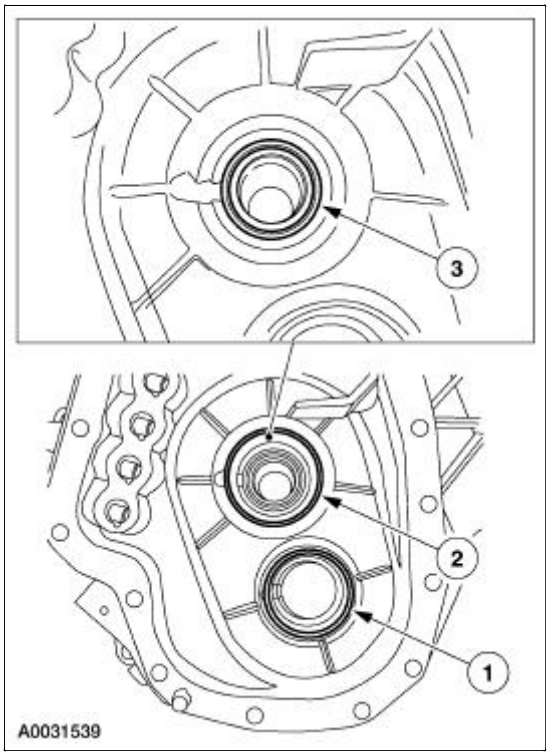
42. Remove the reverse idler gear from the shaft.
    - Inspect the gear for wear or damage. Install a new gear as necessary.



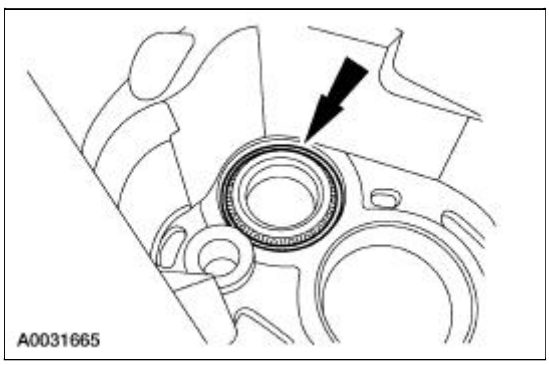
43. Remove the reverse idler gear bearing.
    - The reverse idler gear is three separate pieces: bearing, spacer, bearing.
    - Inspect the bearing for wear or damage. Install new bearings as necessary.



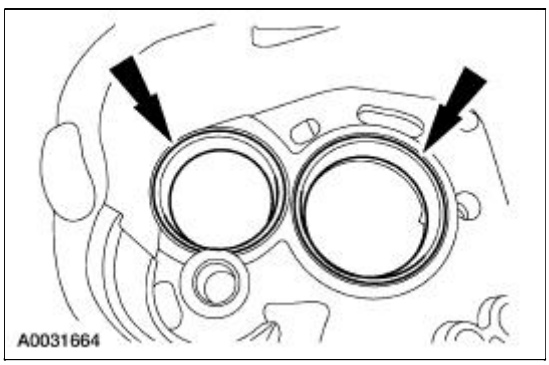
44. Disassemble the clutch housing.
    1. Remove the countershaft bearing cup and shim.
    2. Remove the input shaft bearing cup and shim.
    3. Remove the input shaft seal.
        - Carefully pry out from the inside of the case.



45. Remove the rear countershaft bearing.

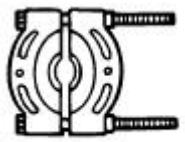


46. Remove the rear countershaft bearing cup and the rear output shaft bearing cup.



Input Shaft and Bearing

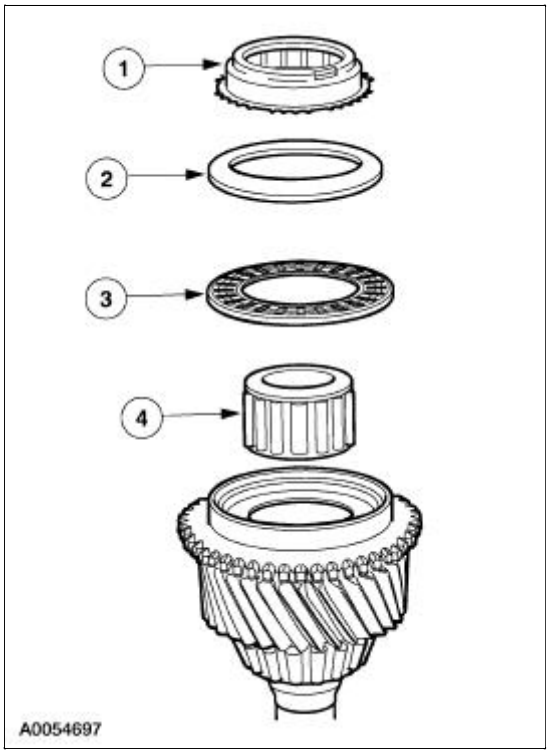
Special Tool(s)

 ST1895-A	Remover, Driver Pinion Bearing Cone 205-D002 (D79L-4621-A) or equivalent
ST2388-A	Installer, Drive Pinion Bearing Cone 205-011 (T57L-4621-B)
ST1303-A	Remover/Installer, Bearing Tube 308-024 (T75L-7025-B)

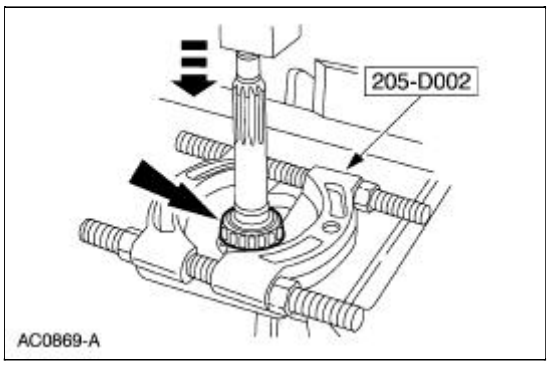
Disassembly and Assembly

1. Disassemble the input shaft.
    1. Remove the third/fourth synchronizer blocking ring.
    2. Remove the input shaft thrust washer.
    3. Remove the input shaft thrust bearing.
    4. Remove the input shaft pocket bearing.

    - Inspect all components for wear or damage. Install new components as necessary.

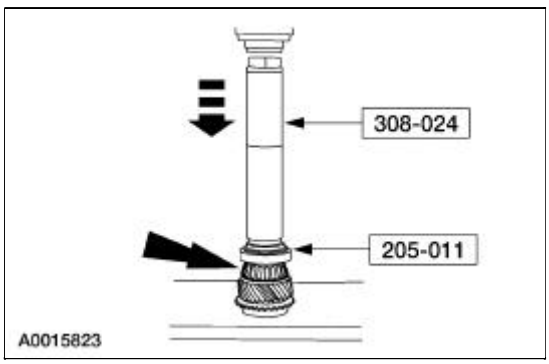


2. Using the special tool and a press, remove the input shaft front bearing assembly. Discard the bearing.



3. Inspect the input shaft and bearings for wear or damage. Install new components as necessary.

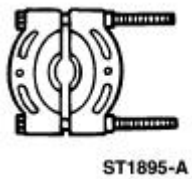
4. Using the special tools and a press, install the new input shaft front bearing.



5. Install the input shaft pocket bearing, the washer, input shaft bearing and the third/fourth synchronizer blocking ring.
    - Lubricate the bearing and bearing race with petroleum jelly.

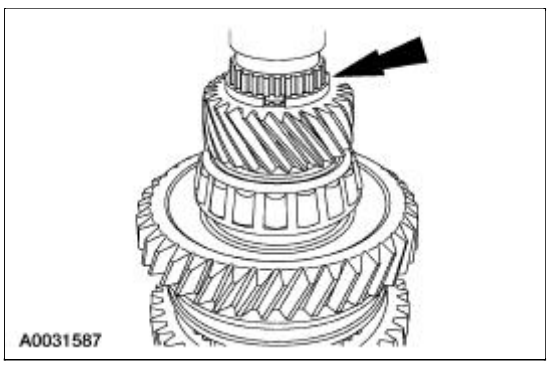
Output Shaft

Special Tool(s)

 ST1895-A	Remover, Drive Pinion Bearing Cone 205-D002 (D79L-4621-A) or equivalent
ST2388-A	Installer, Drive Pinion Bearing Cone 205-011 (T57L-4621-B)

Disassembly

1. Remove the retaining ring above fifth gear.

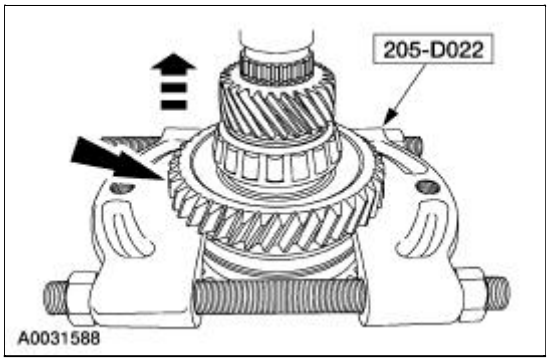


2. **CAUTION: Hand tighten the special tool to prevent gear damage.**

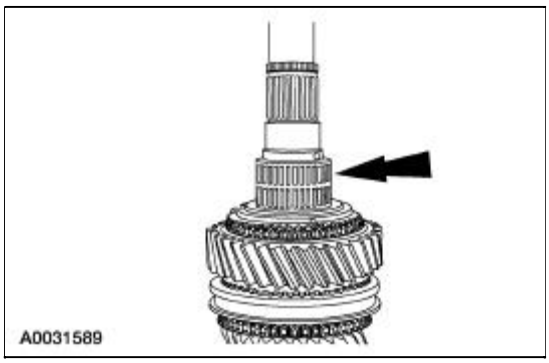
   CAUTION: Support the output shaft while using the press to prevent damage to the shaft or gears.

   Using the special tool, press fifth gear, the spacer, the output shaft bearing and reverse gear from the output shaft.

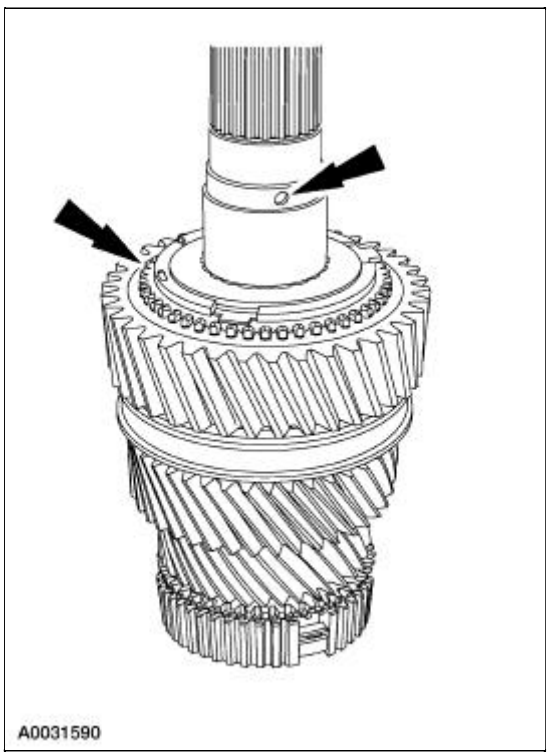
   - Discard the output shaft bearing.



3. Remove reverse gear needle bearing.
    - Inspect the needle bearing for wear or damage. Install a new needle bearing as necessary.

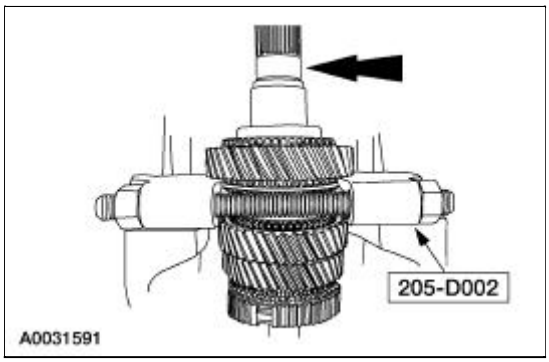


4. Remove the check ball and the blocking ring.
    - Inspect the blocking ring for wear or damage. Install new blocking rings as necessary.

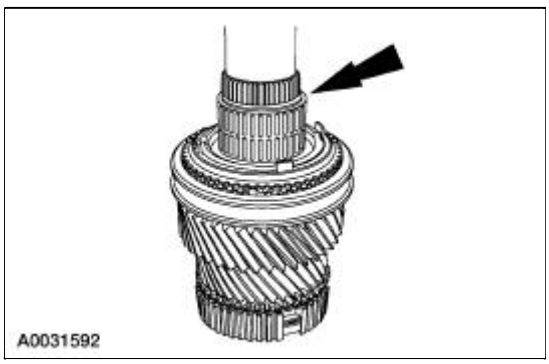


5. **NOTE:** Install the special tool with the flat side facing first gear.

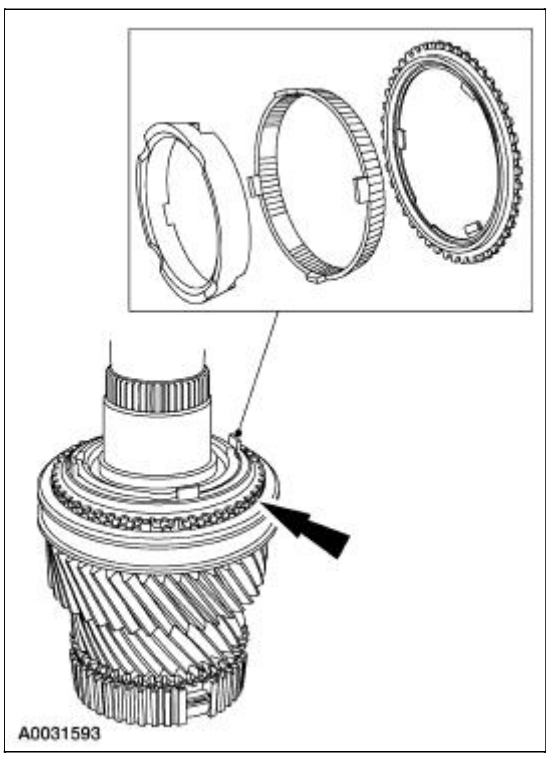
Using the special tools, press the bearing spacer, the reverse gear synchronizer cone and first gear from the output shaft.



6. Remove the first gear needle bearing.
    - Inspect the needle bearing for wear or damage. Install a new needle bearing as necessary.

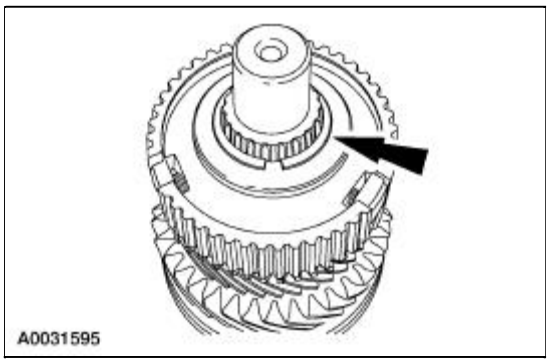


7. Remove the first gear synchronizer inner cone, the first gear synchronizer outer cone and the first gear synchronizer blocking ring.
    - Inspect all components for wear or damage. Install new components as necessary.

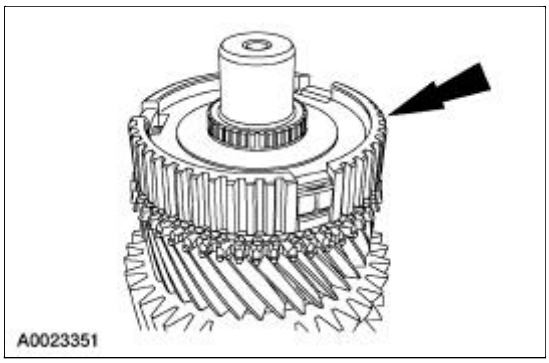


8. **NOTE:** Reposition the output shaft on the press with the input shaft end facing upward.

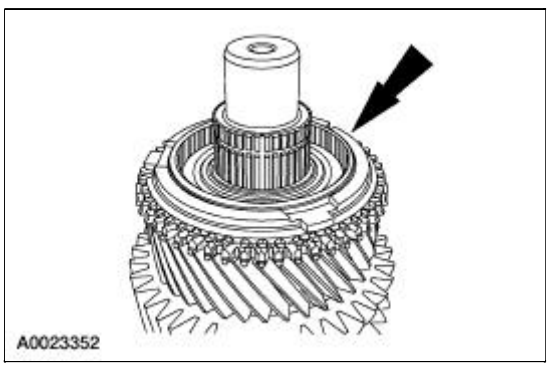
   Remove and discard the retaining ring.



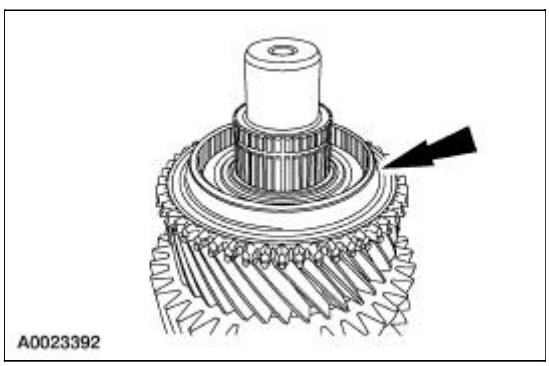
9. Remove the third/fourth synchronizer hub.



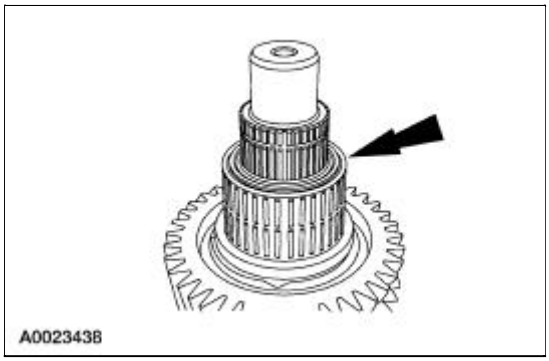
10. Remove the third/fourth blocking ring.



11. Remove the third gear.
    - Inspect the gear for wear or damage. Install a new gear as necessary.

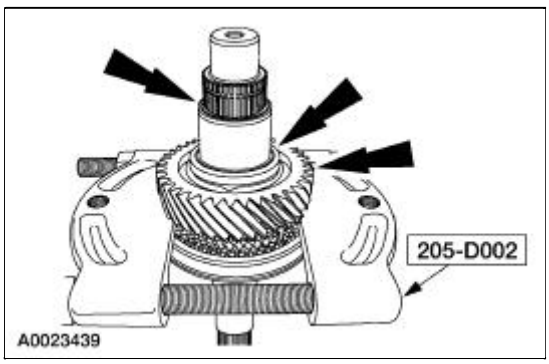


12. Remove the third gear needle bearing.
    - Inspect the needle bearing for wear or damage. Install a new needle bearing as necessary.

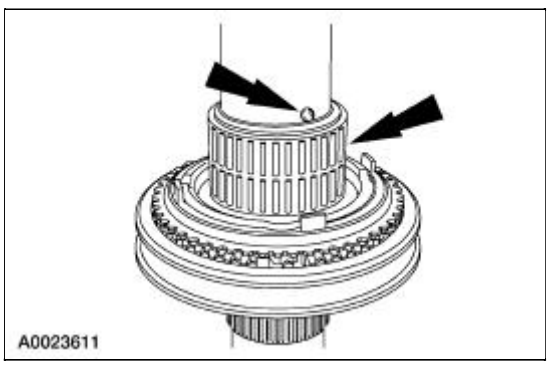


13. **NOTE:** Install the special tool behind second gear with the flat side of the tool facing second gear.

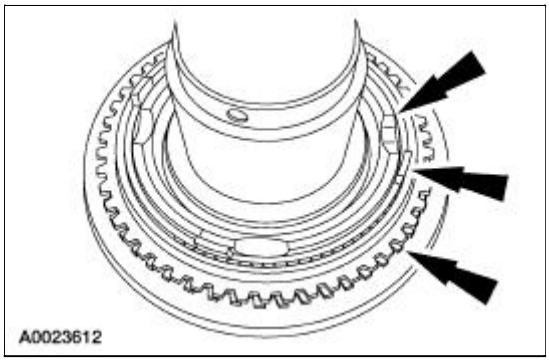
    Using the special tool, remove the spacer, second gear thrust washer and second gear.
    - Inspect the gear for wear or damage. Install a new gear as necessary.



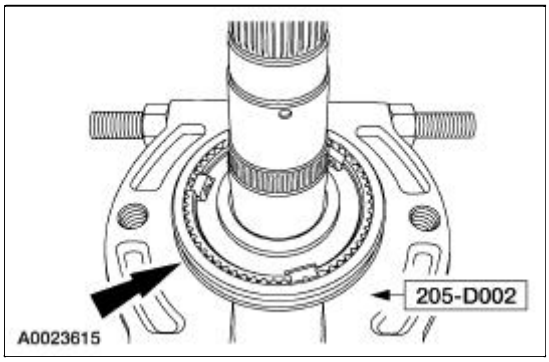
14. Remove the check ball and second gear needle bearing.
    - Inspect the needle bearing for wear or damage. Install a new needle bearing as necessary.



15. Remove the second gear synchronizer inner cone, second gear synchronizer outer cone and the second gear synchronizer blocking ring.
    - Inspect all components for wear or damage. Install new components as necessary.



16. Remove the snap ring, then using the special tool, press off the first/second gear synchronizer.

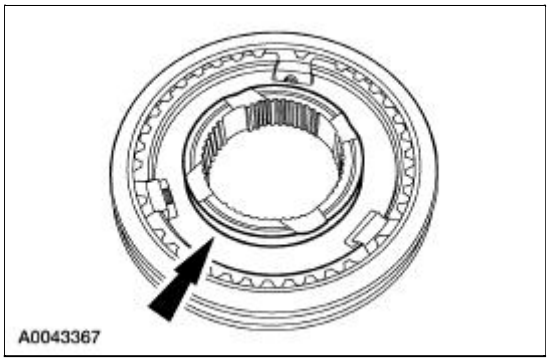


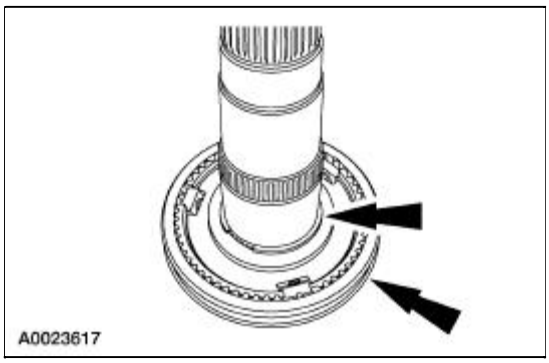
Assembly

1. Carry out the following before reassembling:
   - Inspect the gears for broken or cracked teeth. Check for unusual wear patterns.
   - Inspect the thrust washers for face wear, cracks, scoring and for signs of heat damage.
   - Inspect the bearings, bearing cups and the synchronizers for wear or damage.
   - Inspect the output shaft for scoring or worn or damaged splines. Install new components as necessary.
2. Lubricate all components with the recommended transmission fluid when reassembling.
3. **NOTE:** Position the output shaft with the output end facing upward.

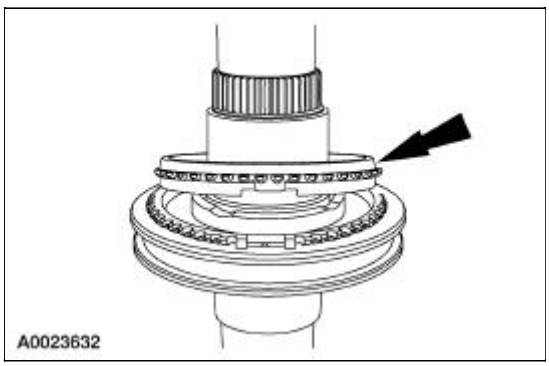
   NOTE: Install the synchronizer assembly with the deeper center flange of the synchronizer hub facing toward the rear of the output shaft.

   Install the first/second synchronizer assembly on the output shaft, then install a new retaining ring.
   - It may be necessary to press the hub into position on the shaft.

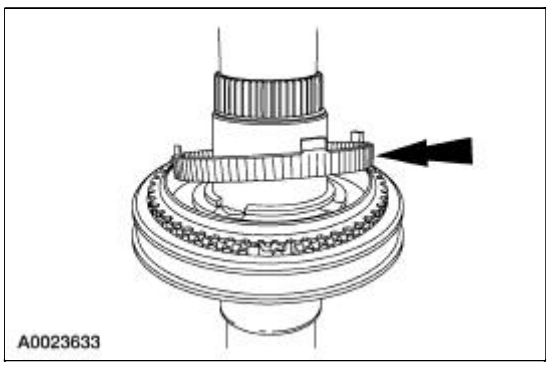




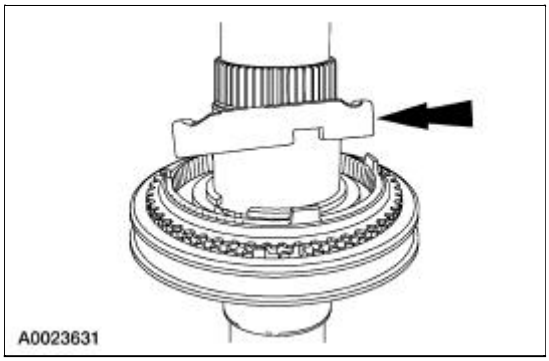
4. Install the first gear synchronizer blocking ring.
    - Align the blocking ring tabs with the synchronizer assembly.



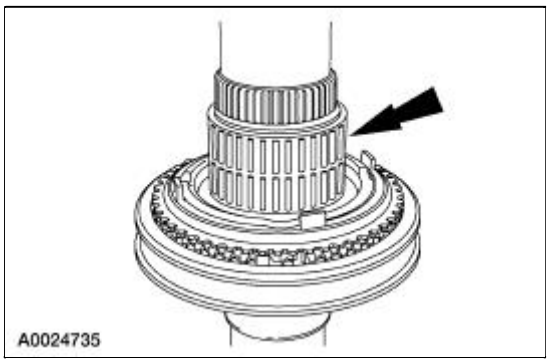
5. Install the outer first gear synchronizer cone.



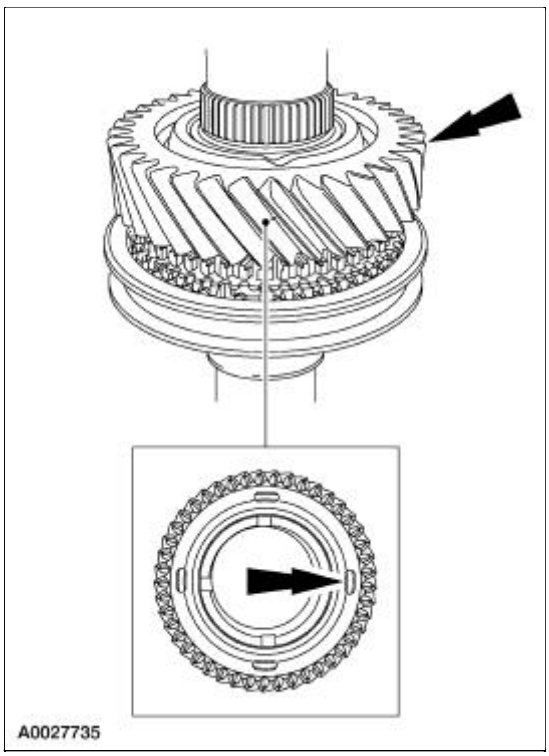
6. Install the inner first gear synchronizer cone. Rotate the inner cone till it is seated.



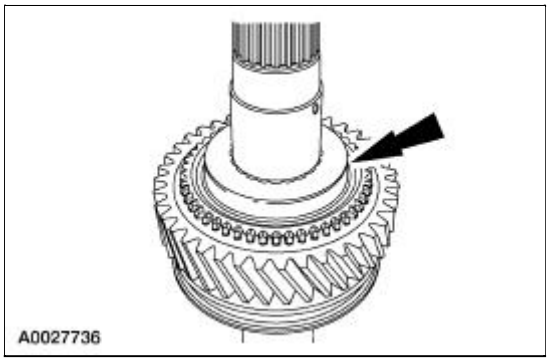
7. Install the first gear needle bearing.
    - Apply petroleum jelly to the bearing.



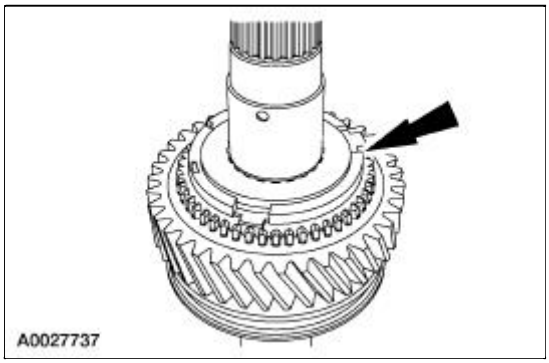
8. Install first gear.
    - Rotate the gear to align the gear slots with the inner cone tabs.



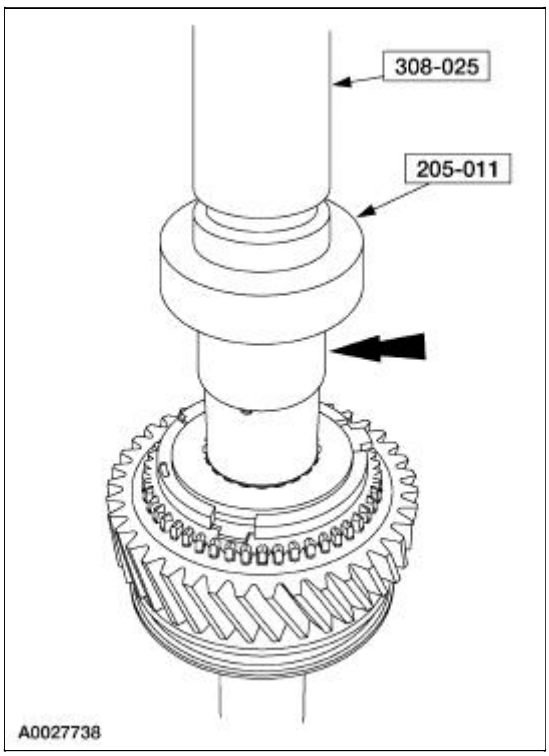
9. Install the reverse synchronizer cone.



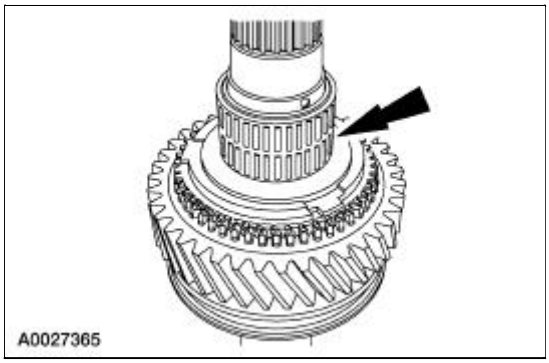
10. Install the reverse gear blocking ring.



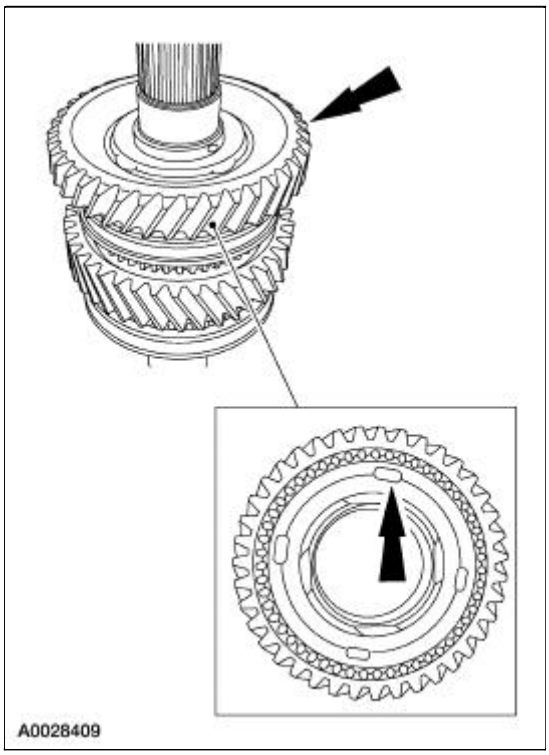
11. Using the special tools, install the reverse gear bearing spacer.



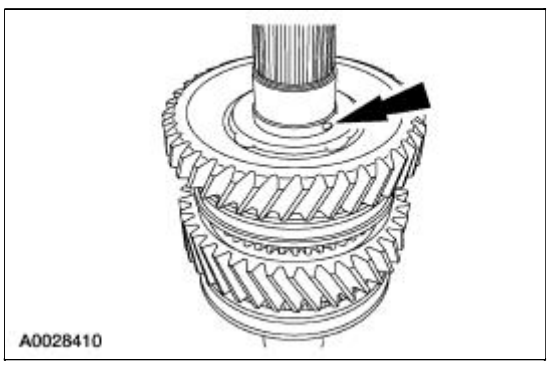
12. Install reverse gear needle bearing.
    - Apply petroleum jelly to the bearing.



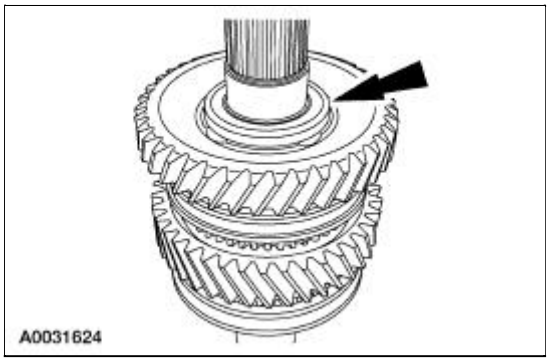
13. Install reverse gear.
    - Rotate the gear to align the gear slots with the inner cone tabs.



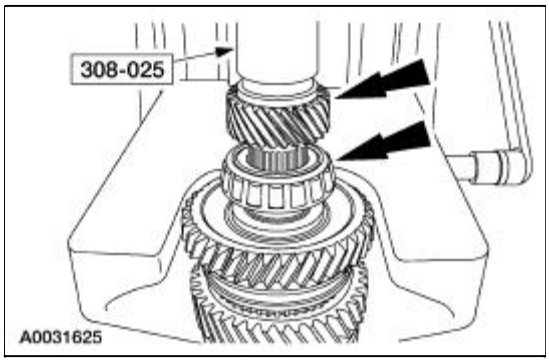
14. Install the check ball.
    - Use petroleum jelly to hold the check ball in place.



15. Install the thrust washer. Be sure to align the slot in the washer with the check ball.

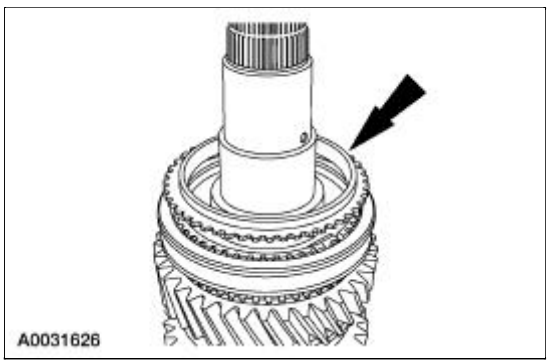


16. Install a new rear output shaft bearing, then fifth gear. Using the special tool, press both the bearing and gear into place.

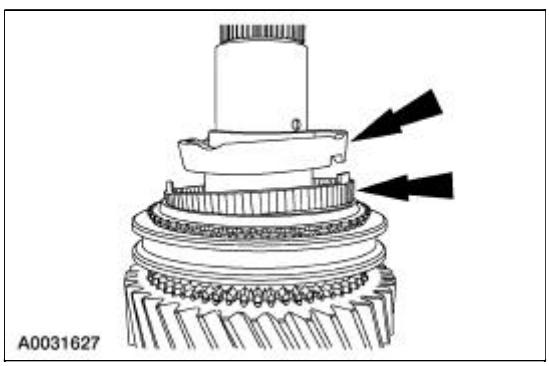


17. Reposition the output shaft with the input end facing upward.

18. Install the second gear synchronizer blocking ring. Rotate the blocking ring until seated.

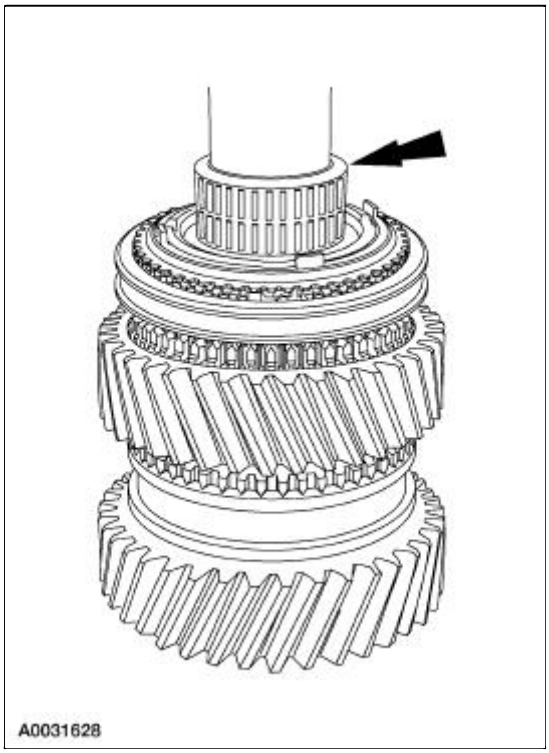


19. Install the second gear synchronizer outer cone and the second gear synchronizer inner cone.

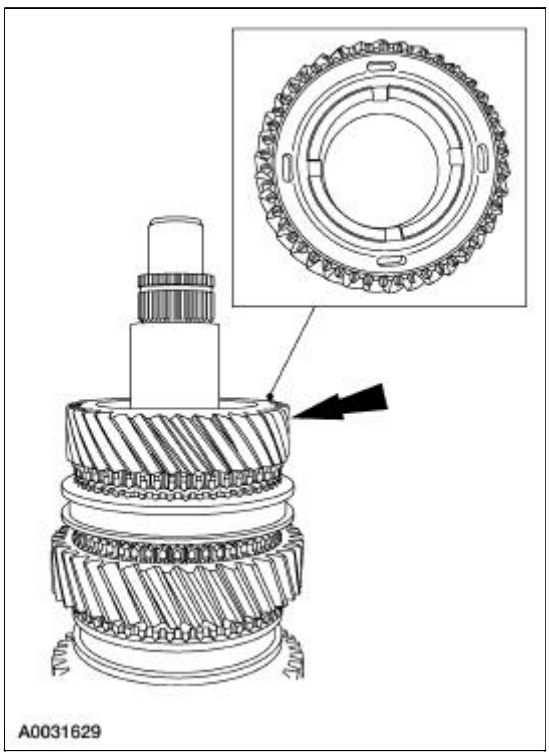


20. Install the second gear bearing.

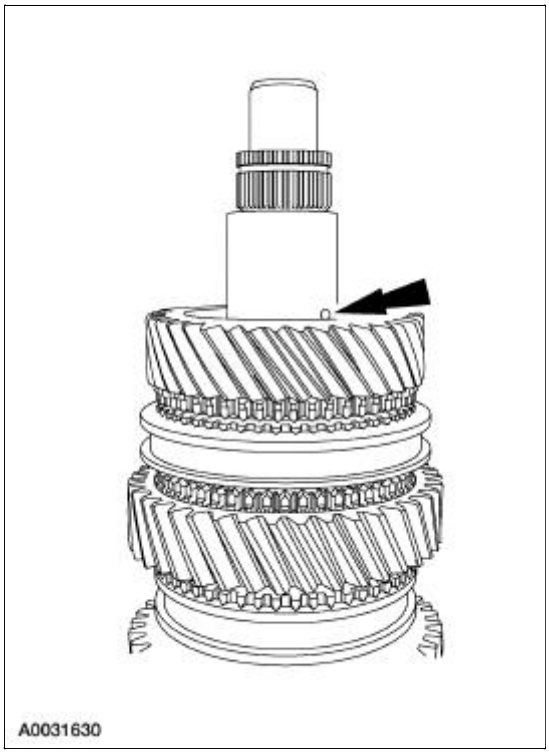
- Apply petroleum jelly to the bearing.



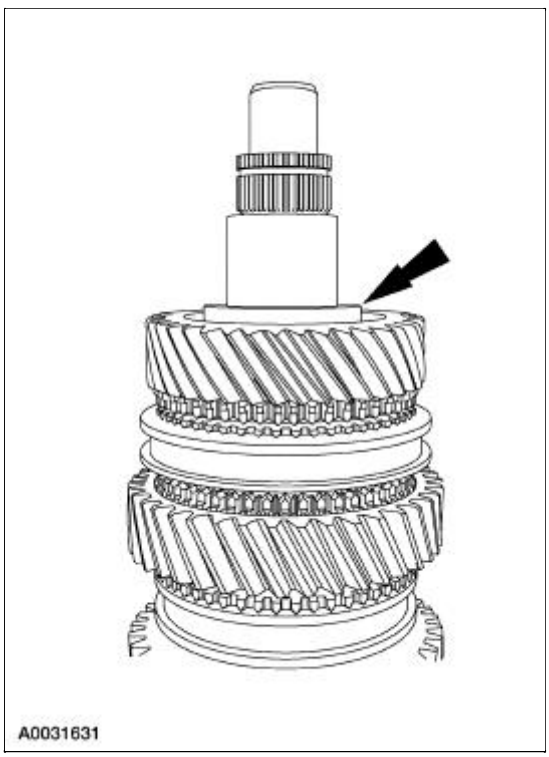
21. Install second gear.
    - Rotate the gear to align the gear slots with the inner cone tabs.



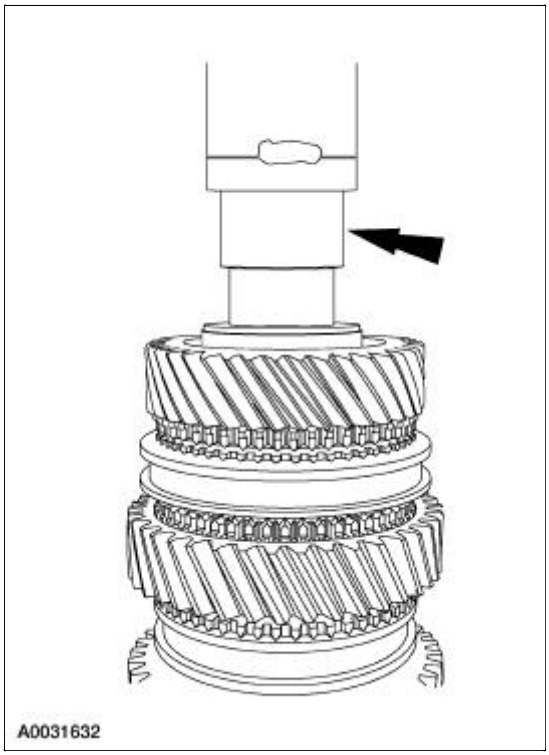
22. Install the check ball.
    - Use petroleum jelly to hold the check ball in place.



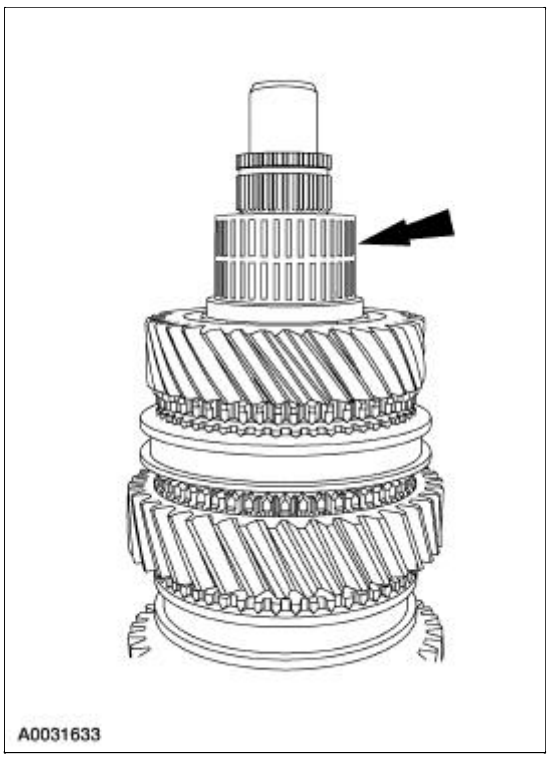
23. Install the thrust washer. Be sure to align the slot in the washer with the check ball.



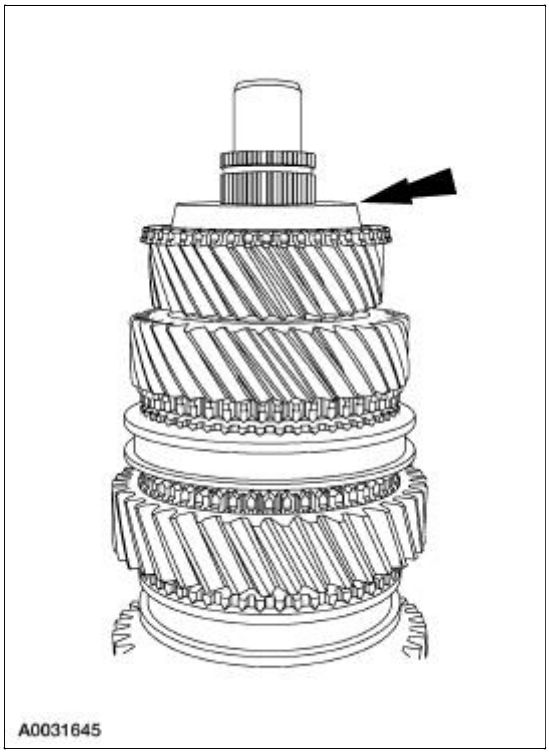
24. Press the bearing spacer onto the output shaft.



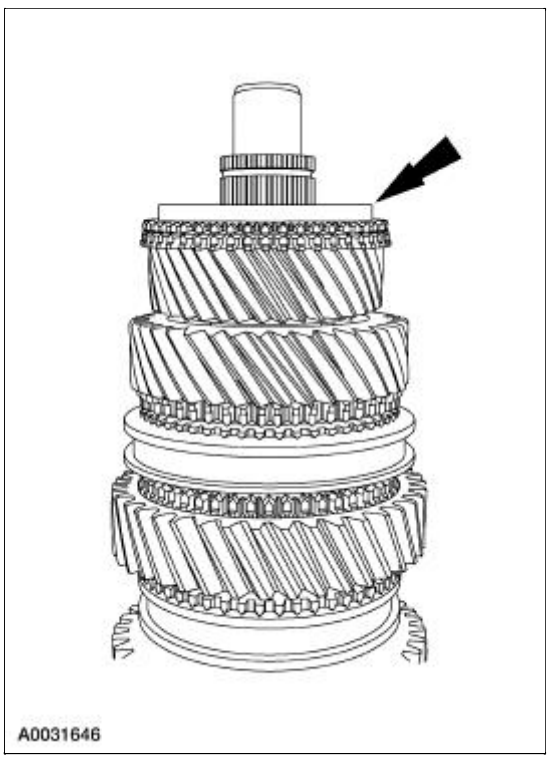
25. Install the third gear bearing.
    - Apply petroleum jelly to the bearing.



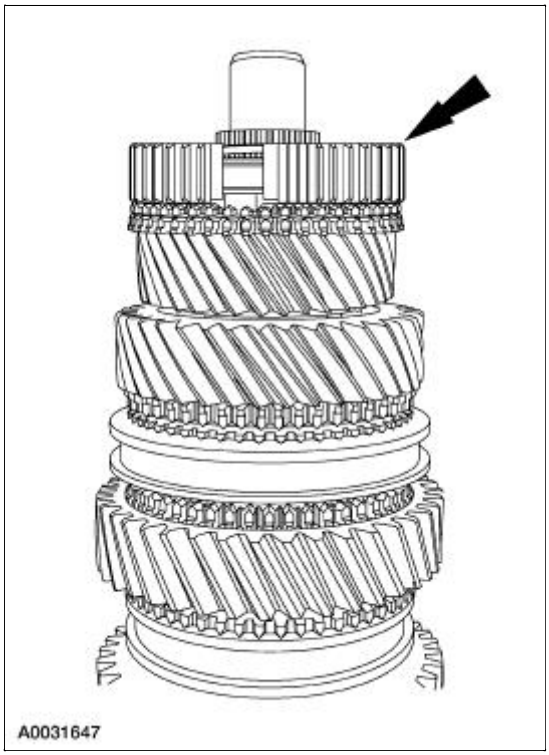
26. Install third gear.



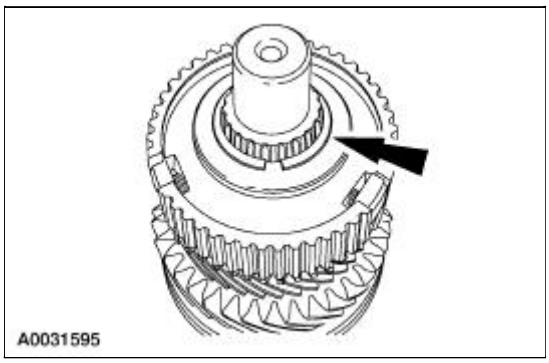
27. Install the third gear synchronizer blocking ring.



28. Install the third/fourth gear synchronizer body.
    - Install the synchronizer body with the raised center facing downward.
    - Rotate the blocking ring until seated.

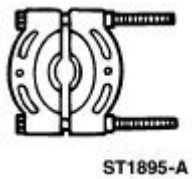


29. Install a new retaining ring.



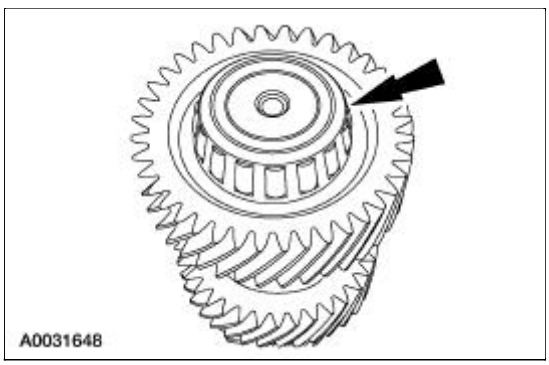
Countershaft Bearing

Special Tool(s)

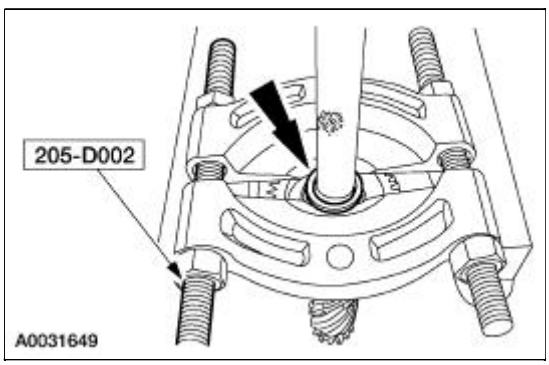
 ST1895-A	Remover, Drive Pinion Bearing Cone 205-D002 (D79L-4621-A) or equivalent
ST2388-A	Installer, Drive Pinion Bearing Cone 205-011 (T57L-4621-B)

Disassembly and Assembly

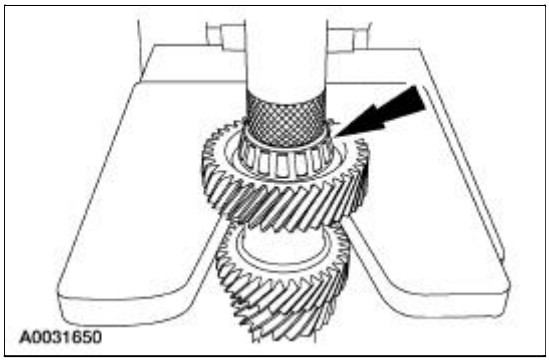
1. Cut the outer cage, then remove the outer cage and rollers.



2. Using the special tool and a press, remove the inner bearing.



3. Using the special tools, install the new countershaft bearing.

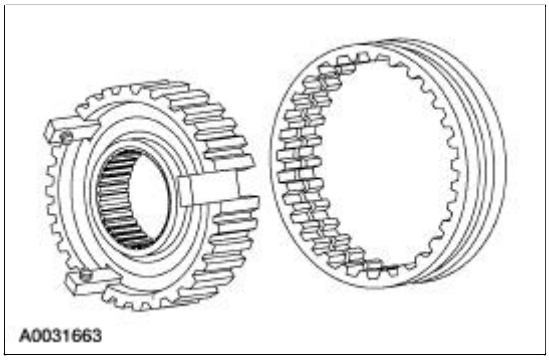

A0031650

Synchronizers

Disassembly and Assembly

NOTE: This procedure applies to all synchronizer assemblies.

1. Scribe an alignment mark on the sliding sleeve and the hub for assembly reference.
2. Remove the sliding sleeve, then remove the synchronizer struts and the springs.



3. Install the synchronizer struts and the springs.
4. **CAUTION: Match the alignment marks made during disassembly. The sleeve and the hub have an extremely close fit. Hold the sleeve and hub square to prevent jamming. Do not force the sleeve onto the hub.**

   Install the sliding sleeve.

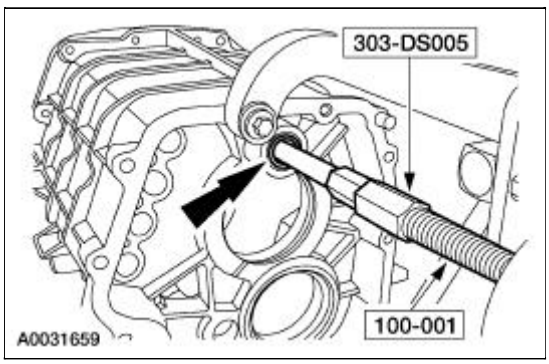
Gearshift Rail Bushing

Special Tool(s)

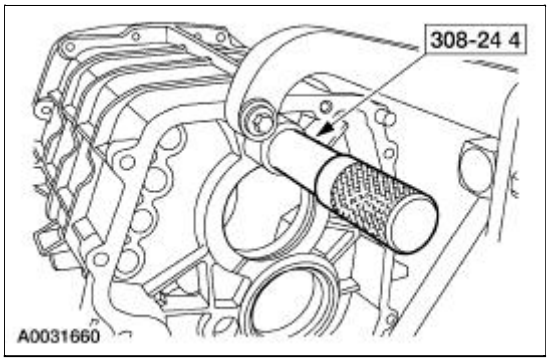
ST1144-A	Universal Puller Set 303-DS005 (D80L-100-A) or equivalent
ST1085-B	Installer, Shift Rail Bushing 308-244 (T96P-7025-F)
ST1185-A	Slide Hammer 100-001 (T50T-100-A)

Disassembly and Assembly

1. Using the special tools, remove the gearshift rail bearing from the transmission case. Discard the bearing.



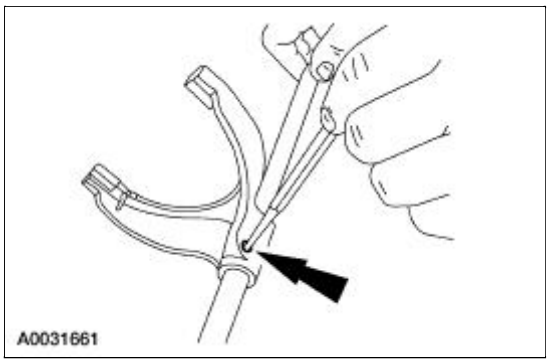
2. Using the special tool, install the main shift rail bearing.


308-24 4
A0031660

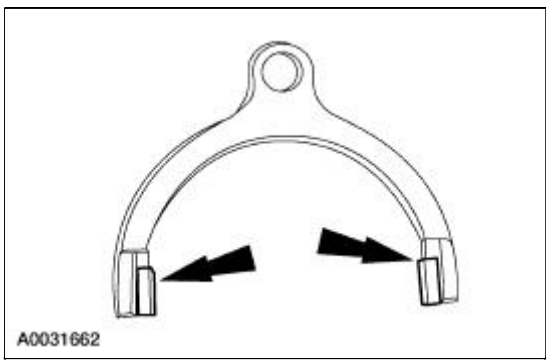
Gearshift Rail and Fork

Disassembly and Assembly

1. Using a 5/32-inch drift and a hammer, remove and discard the split pin. Slide the shift fork from the shift rail.

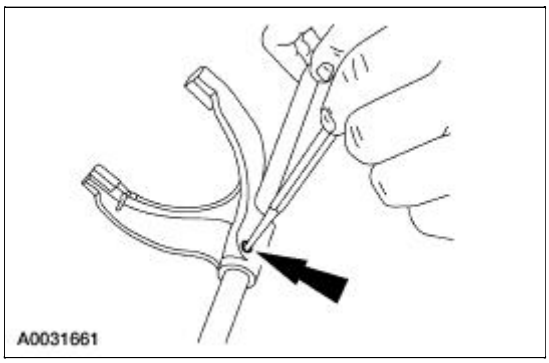


2. Remove the gearshift fork inserts.

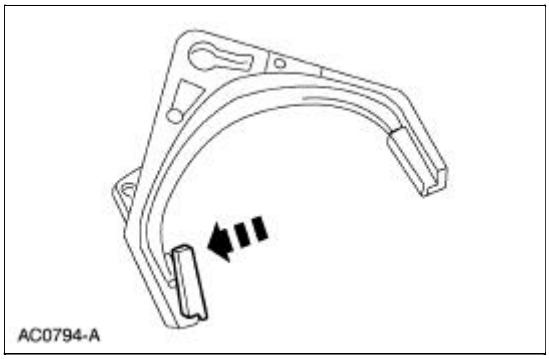


3. **CAUTION: Support the shift rail to prevent damage to the parts.**

   Position the gearshift fork on the shift rail. Align the split pin hole and install a new split pin.

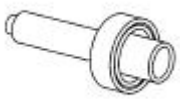


4. Install the gear shift fork inserts.


AC0794-A

Transmission

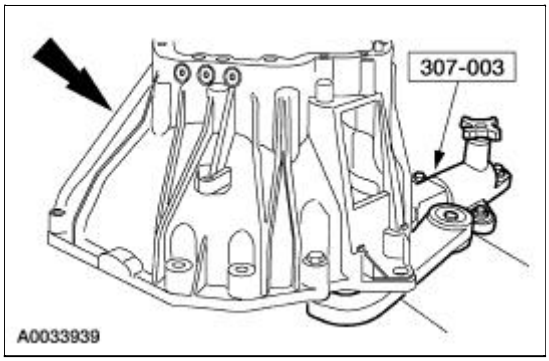
Special Tool(s)

ST1214-A	Dial Indicator Gauge with Holding Fixture 100-002 (TOOL-4201-C) or equivalent
ST1186-A	Holding Fixture, Transmission 307-003 (T57L-500-B)
ST1303-A	Remover/Installer, Bearing Tube 308-024 (T75L-7025-B)
ST2338-A	Replacer/Adapter 308-239 (T96P-7025-A)
 ST2199-A	Installer, Transmission Extension Housing Oil Seal 308-227 (T94P-7657-A)

Material

Item	Specification
Motorcraft MERCON® Multi-Purpose (ATF) Transmission Fluid XT-2-QDX	MERCON
Premium Long Life Grease XG-1-C, K or T	ESA-M1C75-B

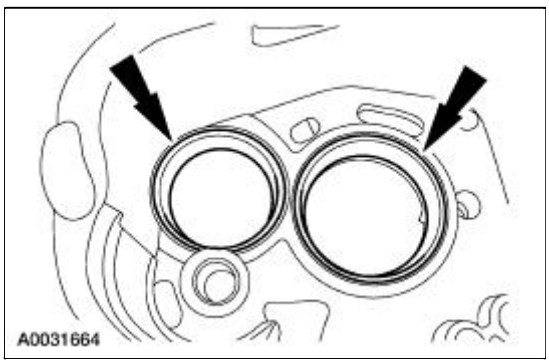
1. Lubricate all components with transmission fluid during assembly.
2. Attach the clutch housing to the special tool.



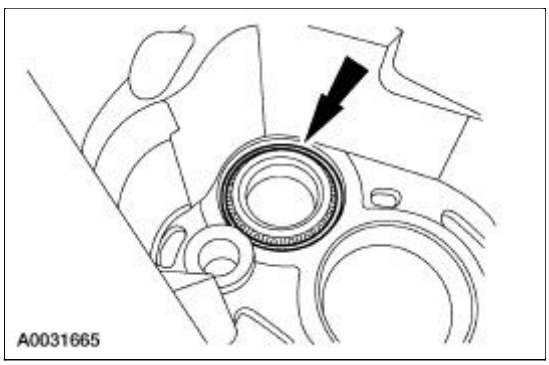
3. **NOTE:** If a new rear output shaft bearing was installed or a new rear countershaft bearing is being used, install new bearing cups.

   Install the rear countershaft bearing cup and the rear output shaft bearing cup.

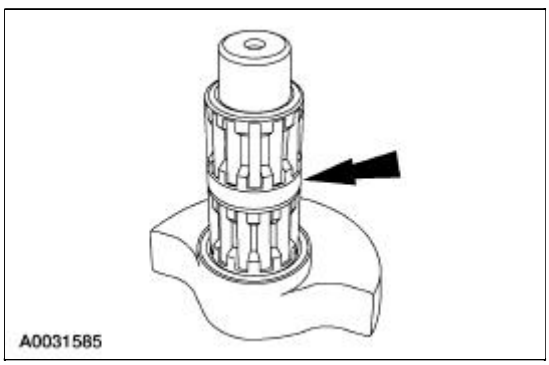
   - Lubricate the bearing cups and the shift rail bearing with petroleum jelly.



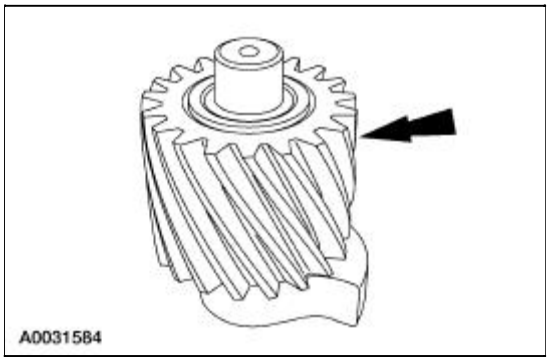
4. Install the rear countershaft bearing.



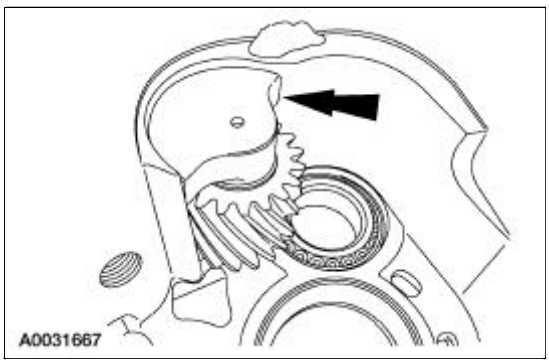
5. Install the reverse idler gear bearings and spacer on the shaft.



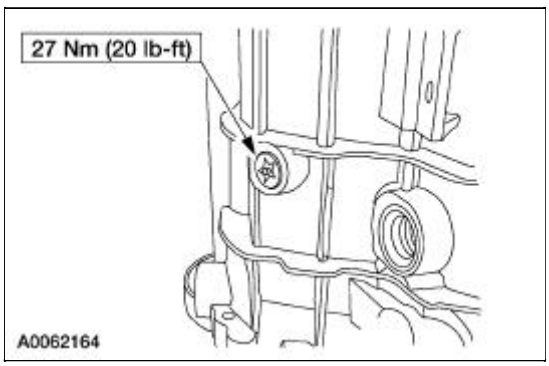
6. Install the reverse idler gear on the shaft.



7. Install the reverse idler gear into the case.



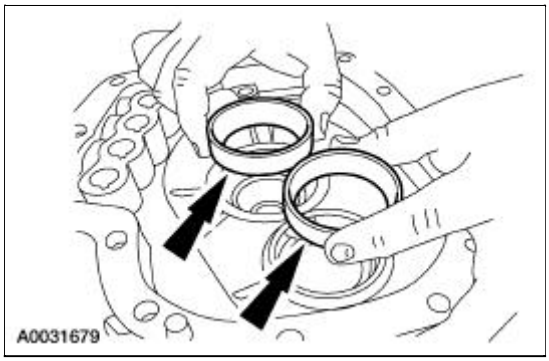
8. Install a new seal on the reverse idler bolt, then install the bolt in the transmission case.



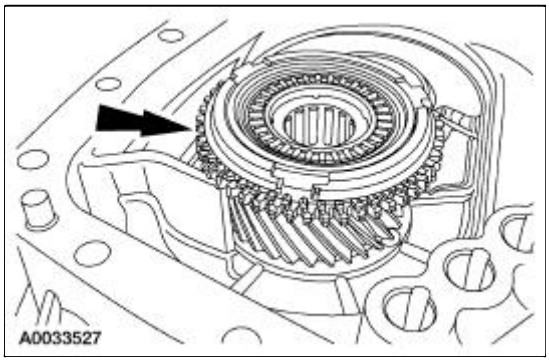
9. **NOTE:** If a new front input shaft bearing or front countershaft bearing was installed, install new bearing cups.

   Install the front input shaft bearing cup and the front countershaft bearing cup. Do not install the shims at this time.

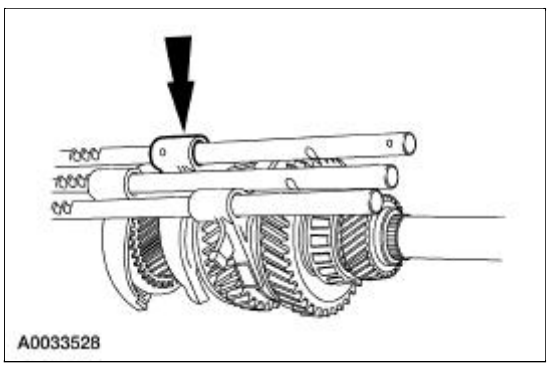
   - Install the transmission main case.



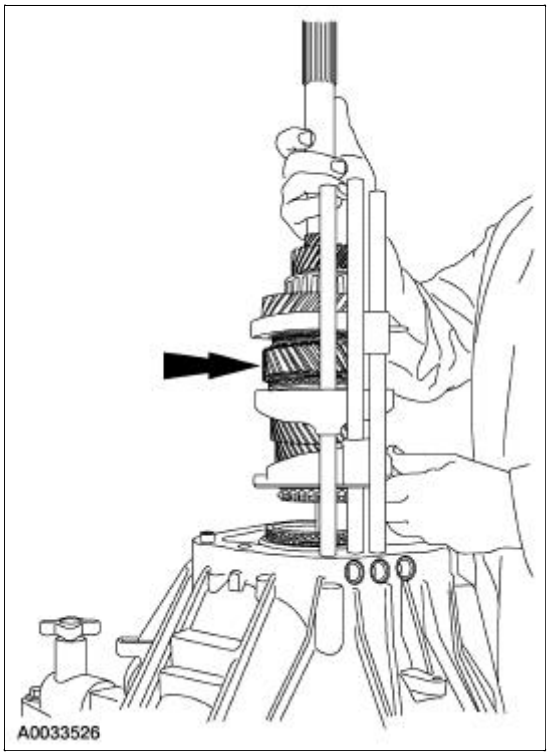
10. Install the input shaft.



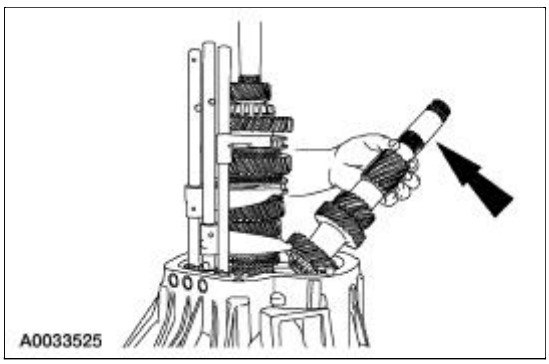
11. Install the shift rails and shift forks on the mainshaft.



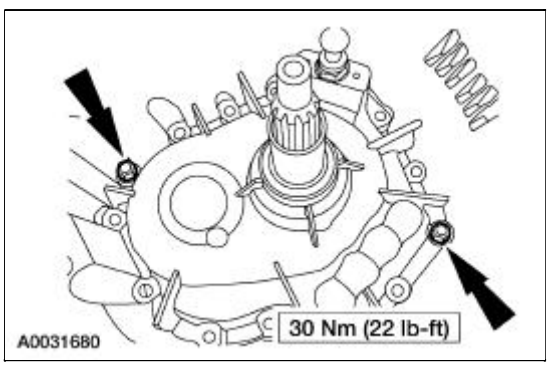
12. Install the mainshaft onto the clutch housing.
    - The notches on the shift rail should be pointing upward.
    - Align the shift rails in the bores.



13. Install the countershaft.
    - Lift the mainshaft upward, tilt the countershaft and install.



14. Install the case with two opposing bolts.

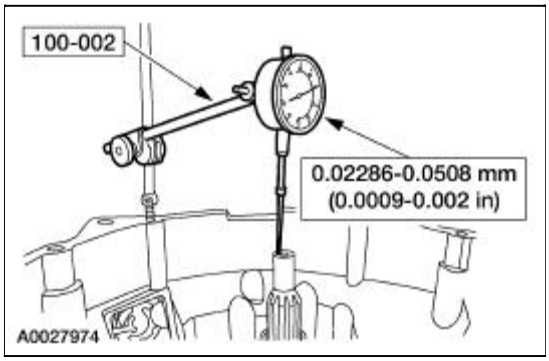


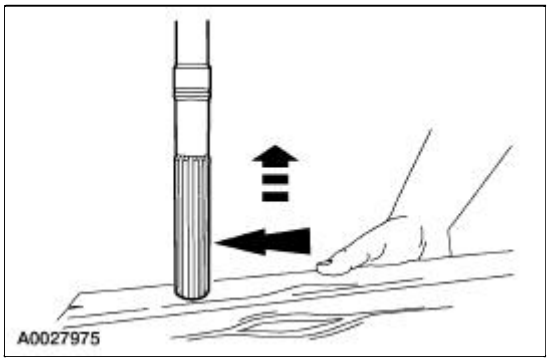
15. **NOTE:** Rotate the transmission so that the input shaft is pointing upward.

    NOTE: Rotate the input shaft to seat the bearings.

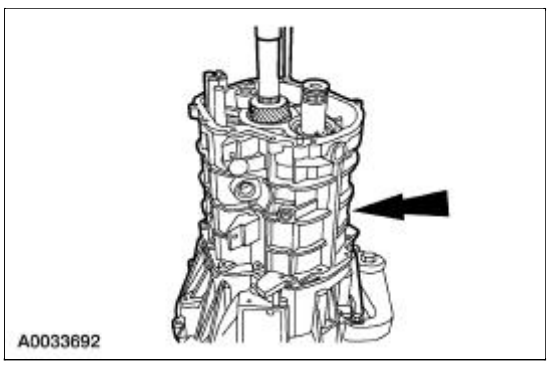
    Using the special tools, measure the input shaft end play by applying an upward load on the

output shaft. Record the measurement.



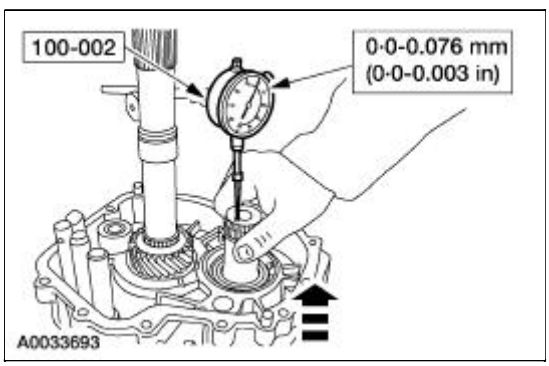


16. Rotate the transmission so that the input shaft is pointing downward.

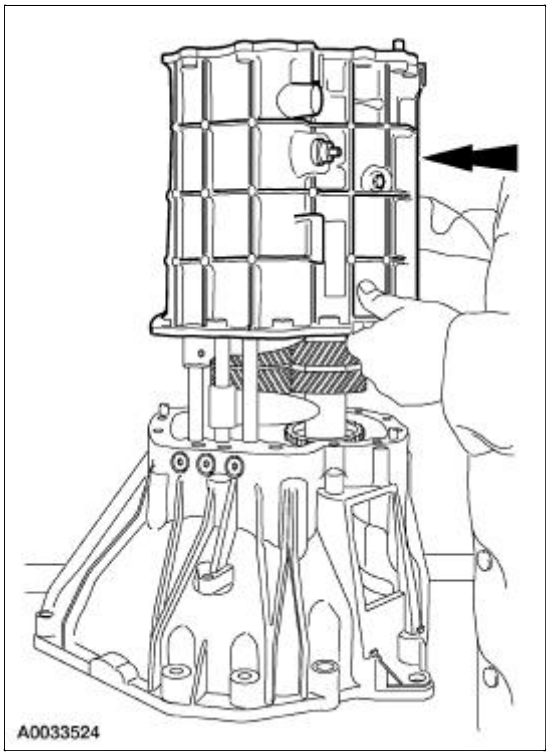


17. **NOTE:** Rotate the countershaft to seat the bearings.

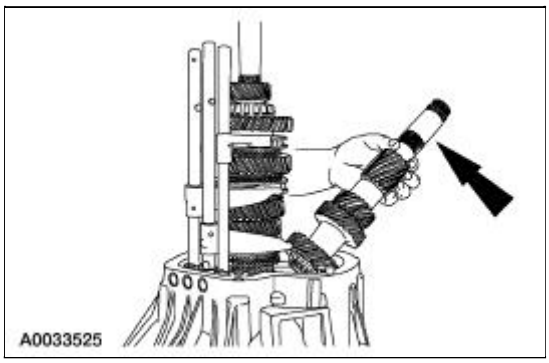
    Using the special tools, measure the countershaft gear end play by pulling upward on the countershaft. Record the measurement.



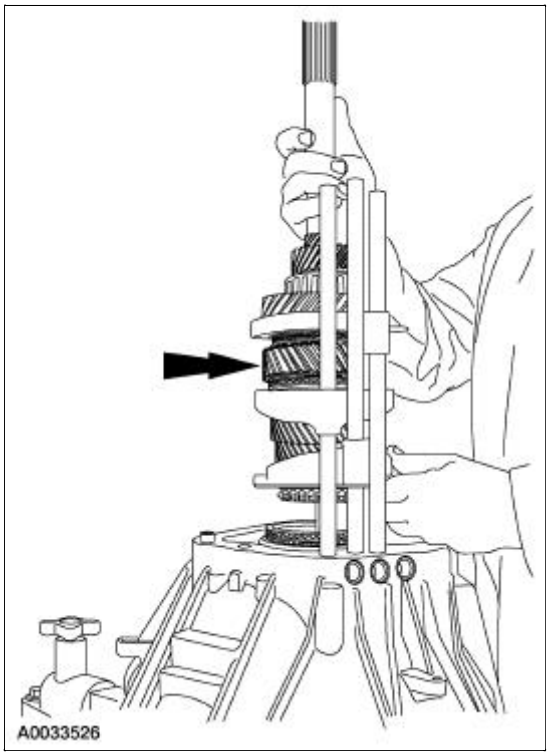
18. Remove the two bolts and lift the transmission main case off.



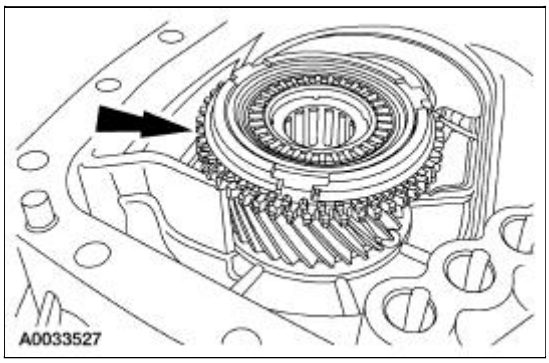
19. Remove the countershaft.



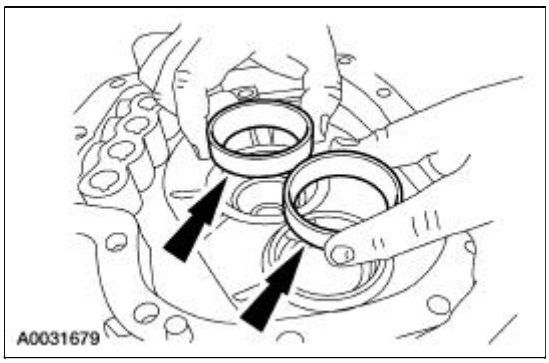
20. Remove the mainshaft.



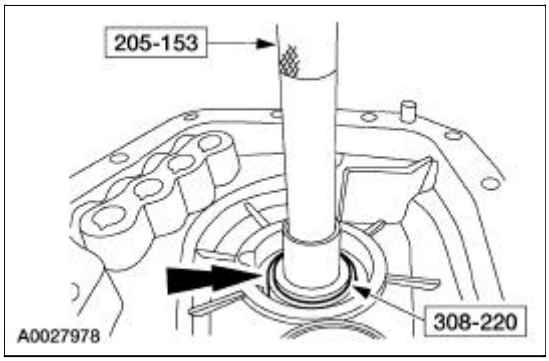
21. Remove the input shaft.



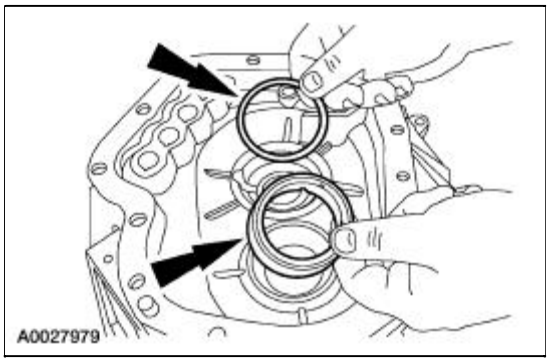
22. Remove the front input shaft bearing cup and the front countershaft bearing cup.



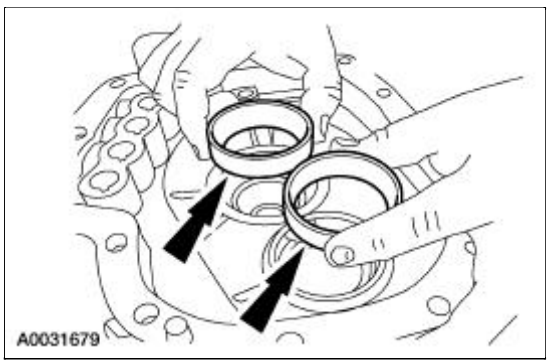
23. Using the special tools, install the new input shaft seal.



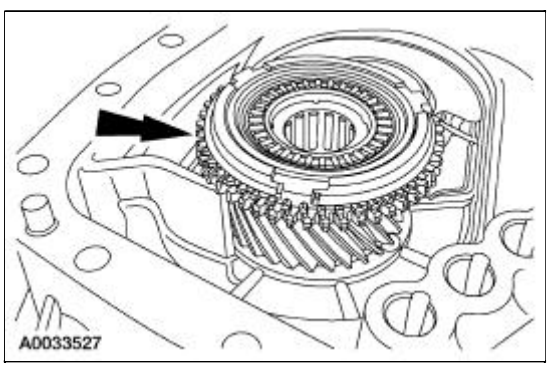
24. Using the recorded end play measurements, select and install the appropriate shims to achieve the correct end play.



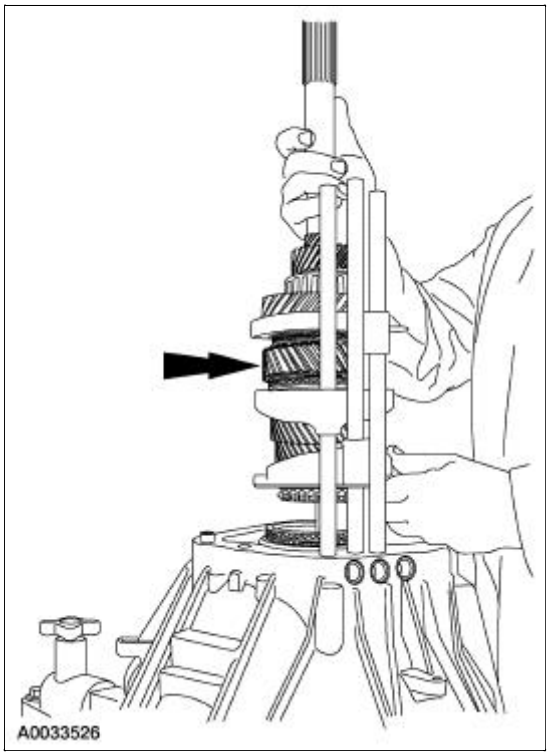
25. Install the front input shaft bearing cup and the front countershaft bearing cup.



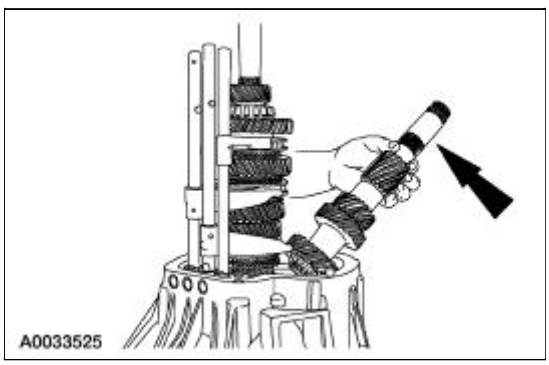
26. Install the input shaft.



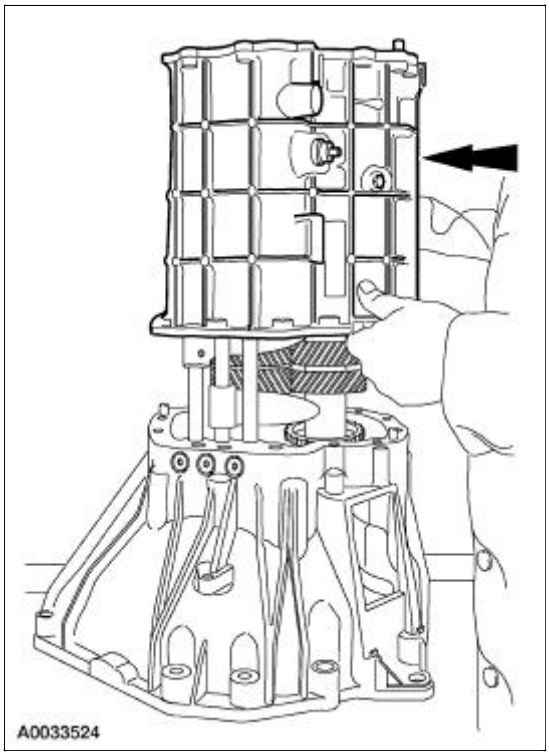
27. Install the mainshaft.



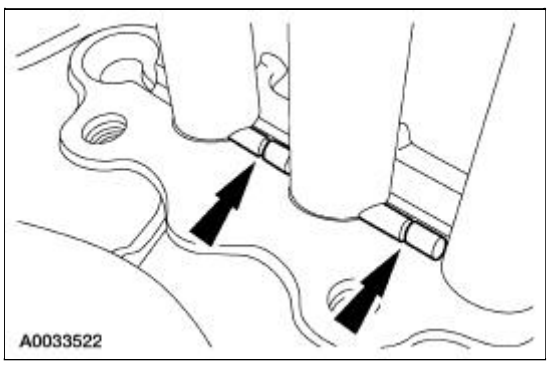
28. Install the countershaft.



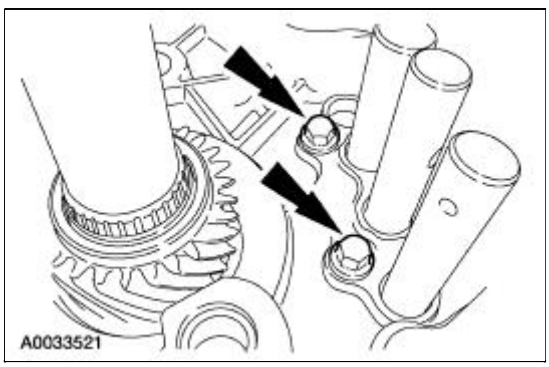
29. Clean the mating surfaces of the transmission main case and the clutch housing. Apply a bead of silicone rubber to the sealing surface on the clutch housing then install the transmission main case. Tighten the bolts in a star pattern.

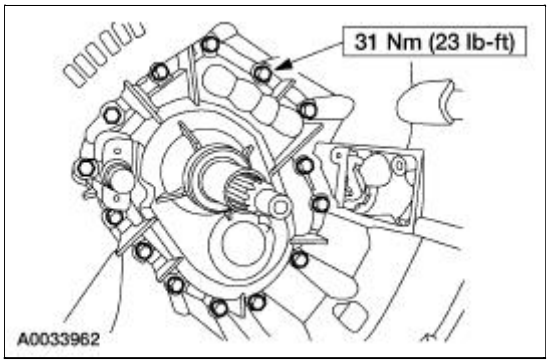


30. Install the lock pins.

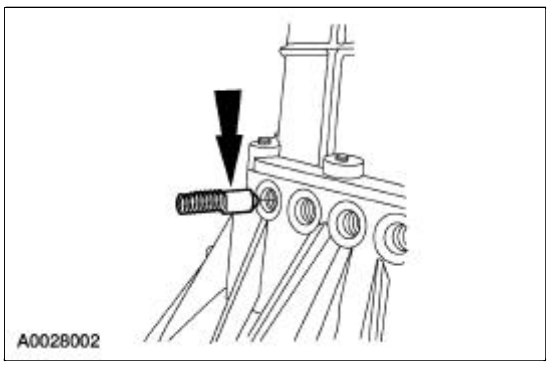


31. Install the lock plate.

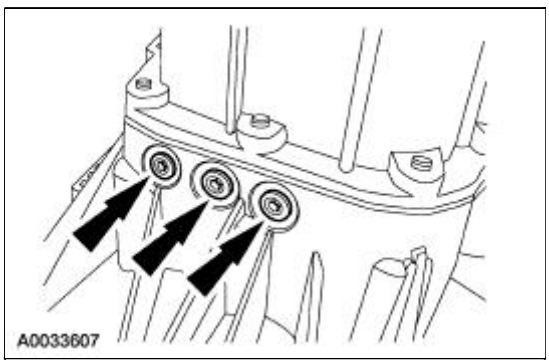




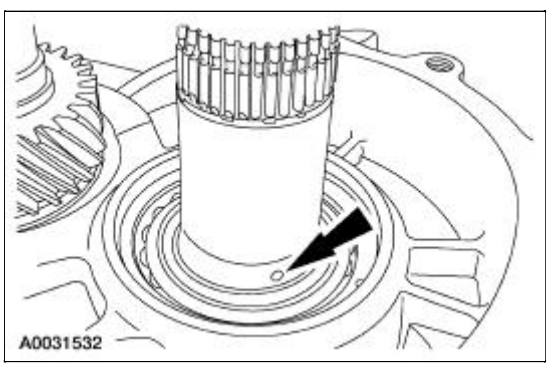
32. Install the detents and the detent springs.



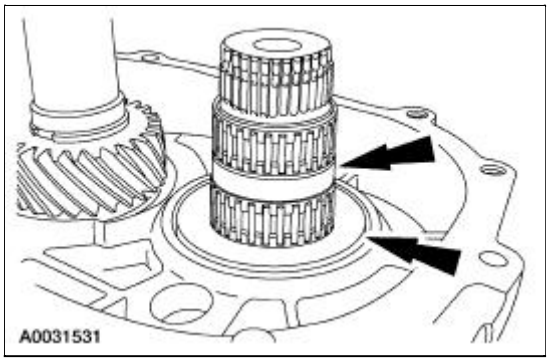
33. Install the detent plugs.



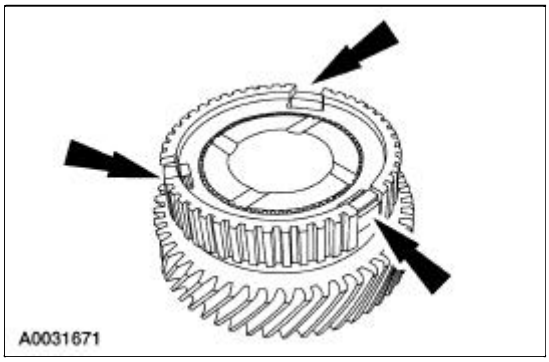
34. Install the check ball.
    - Use petroleum jelly to hold the check ball in place.



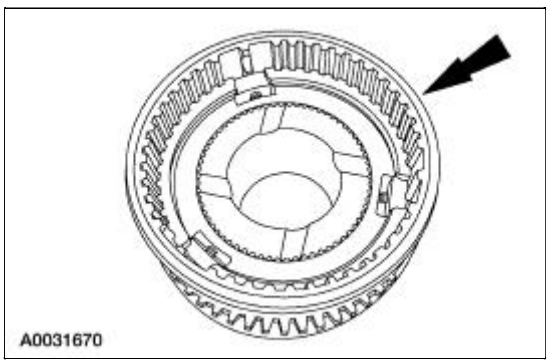
35. Install the thrust washer and the three-piece fifth gear needle bearing.



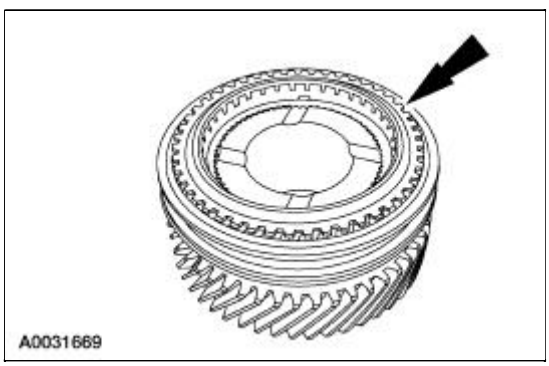
36. Install the synchronizer springs and inserts.



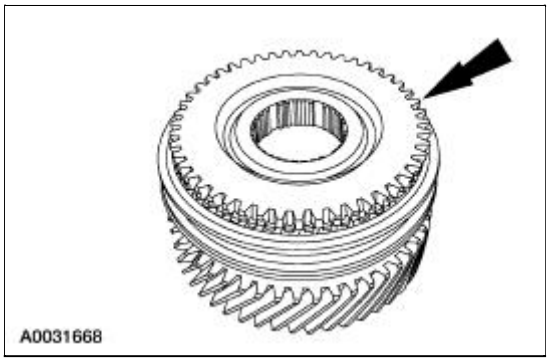
37. Install the sliding sleeve on the synchronizer hub.
    - Align the pockets in the blocking ring with the struts in the synchronizer.
    - The sliding sleeve is not reversible. Install the sleeve with the bevel edge away from the gear.



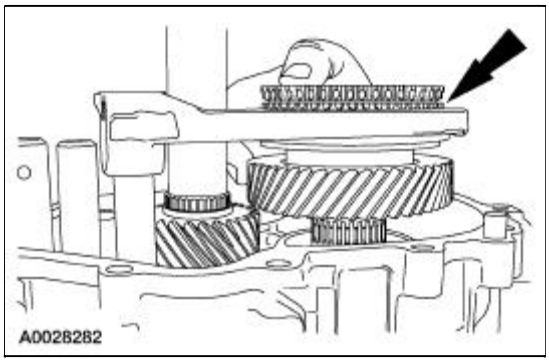
38. Install fifth gear blocking ring.



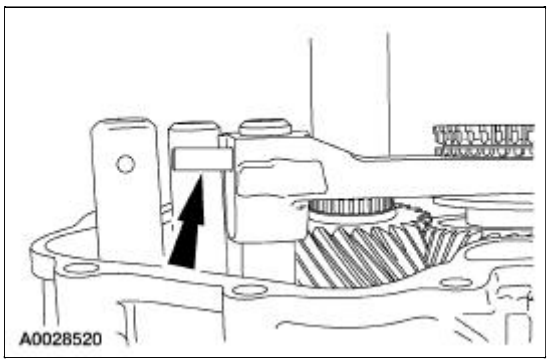
39. Install the fifth gear synchronizer cone.



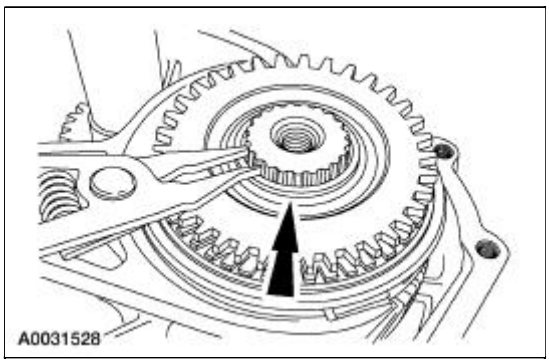
40. Install the fifth gear shift fork, the synchronizer assembly, the synchronizer cone and fifth gear as an assembly.



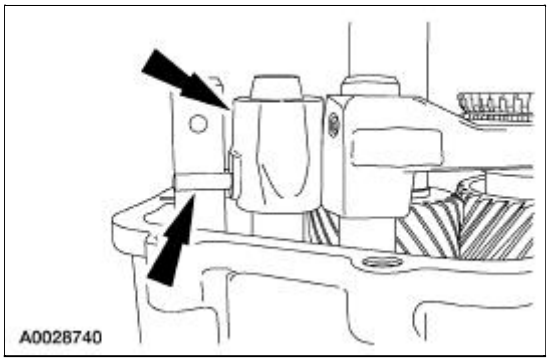
41. Install a new split pin.
    - Install the pin until it is flush with the fork.



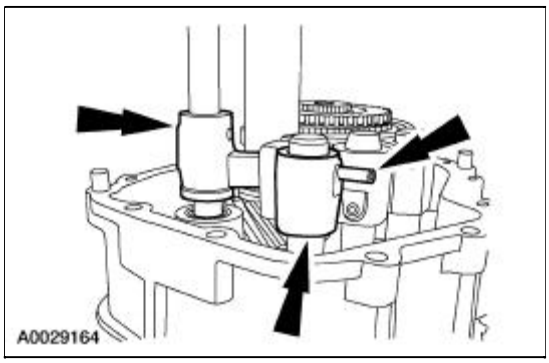
42. Install a new snap ring.



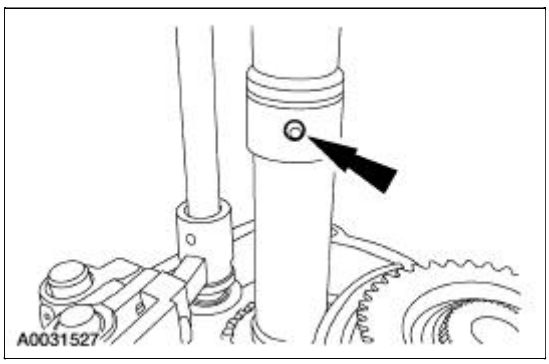
43. Install the third/fourth shift finger, then install a new split pin.
    - Install the split pin until it is flush with the shift finger.



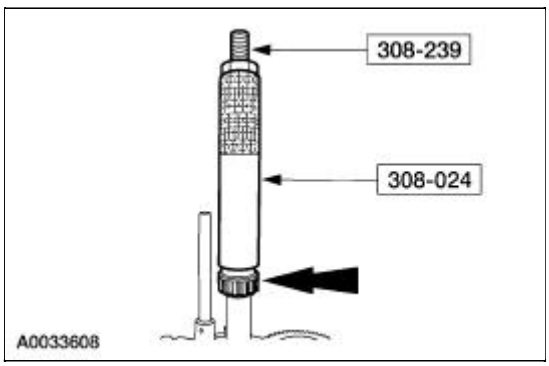
44. Install the control rail and the plastic spacer, then install the first/second shift finger. Install a new split pin.
    - Install the split pin until it is flush with the shift finger.



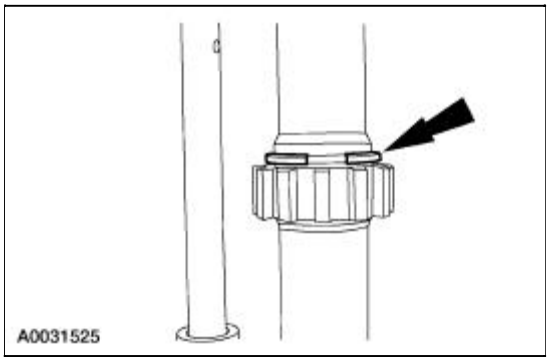
45. Install the OSS sensor tone wheel check ball.
    - Use petroleum jelly to hold the check ball in place.



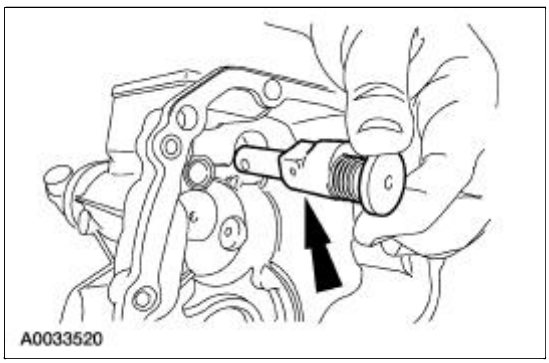
46. Place the OSS sensor tone wheel on the output shaft, aligning the slot in the OSS wheel with the check ball. Using the special tool, install the OSS sensor tone wheel.



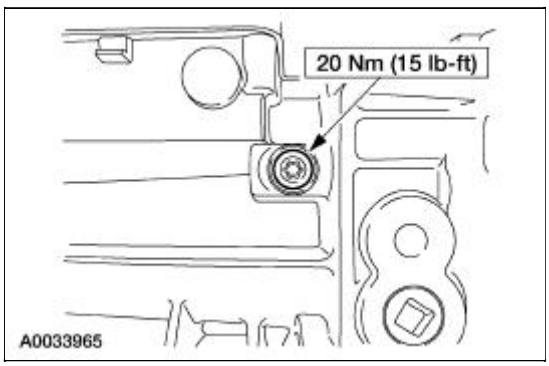
47. Install a new OSS sensor tone wheel retaining ring.



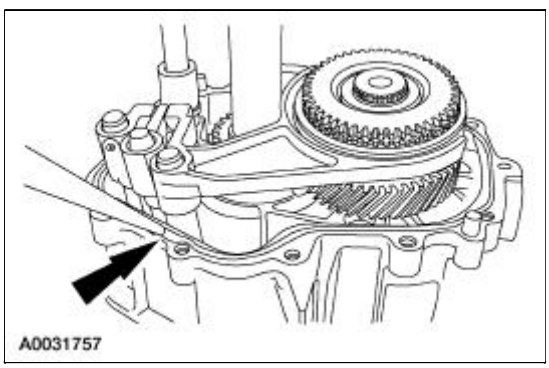
48. Install the fifth/reverse gear lockout.



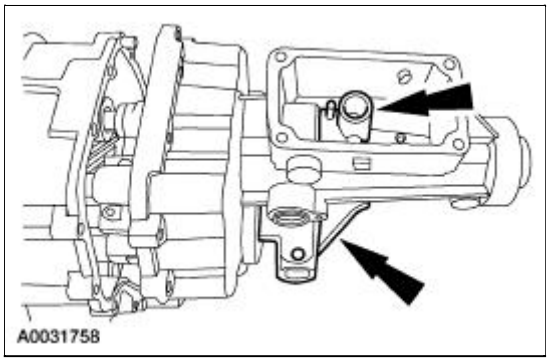
49. Install the bolt.



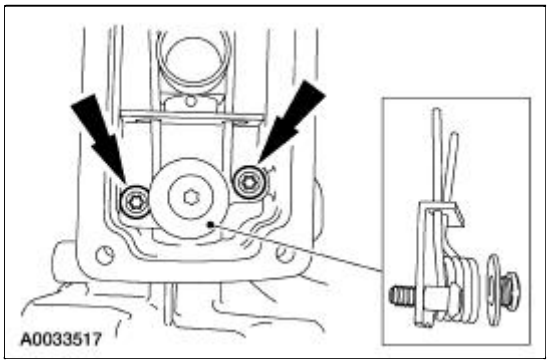
50. Clean the mating surfaces of the transmission main case and the extension housing. Apply a bead of silicone rubber to the sealing surface of the transmission case.



51. Install the extension housing and at the same time install the gear shift off-set lever.

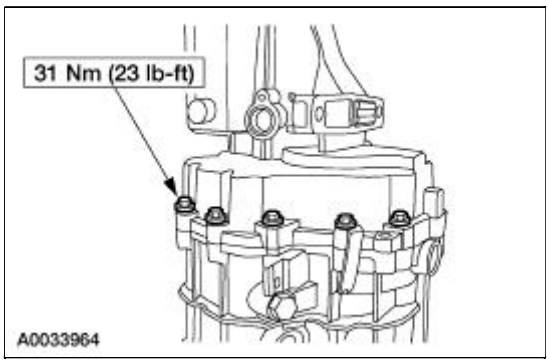


52. Install the shift spring and bracket.

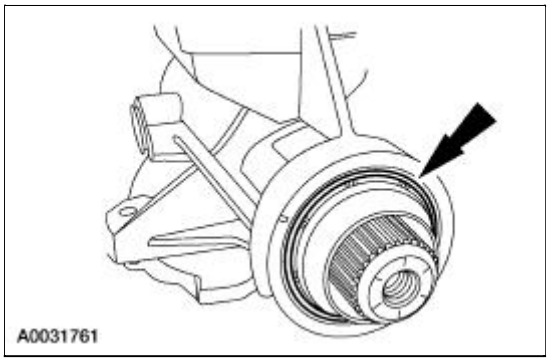


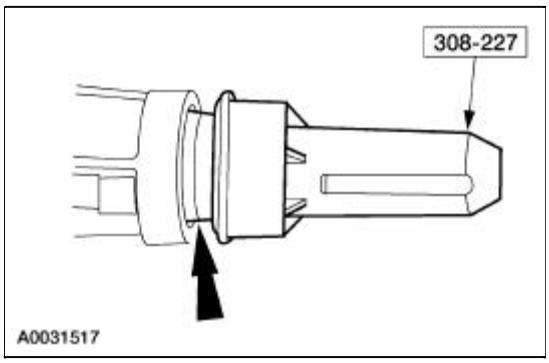
53. Install a new split pin in the gear shift off-set lever.
    - The split pin should be flush in the gear shift off-set lever.

54. Seat the extension housing and tighten the bolts to specification.
    - Fill the gear shift off-set lever with petroleum jelly.

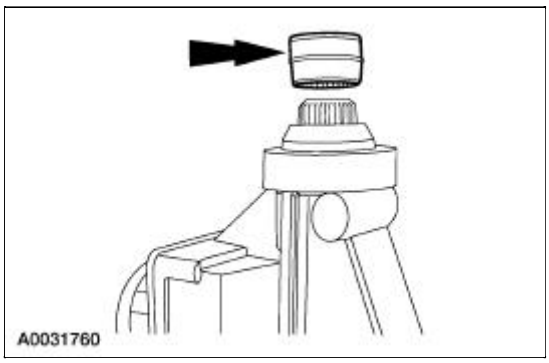


55. Using the special tool, install a new extension housing seal.
    - Lubricate the seal with transmission fluid.





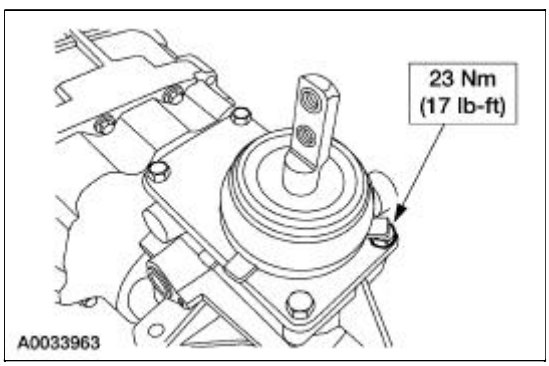
56. Install the shipping seal.



57. Rotate the transmission to a horizontal position.

58. Clean the mating surfaces of the shift cover opening surface and the shift cover. Apply a bead of silicone rubber to the shift cover opening surface.

59. Install the gear shift lever.



60. **NOTE:** Before installing the transmission, the ball stud, the clutch release lever and the input

shaft guide tube must be cleaned and lubricated.

Install the clutch release hub and bearing and the clutch release lever. For additional information, refer to Section 308-01.

61. Fill the transmission with transmission fluid to the specified level.
    - Transmission capacity is 3.6 liters (7.5 pints).

Transmission

Material

Item	Specification
Motorcraft MERCON® Multi-Purpose (ATF) Transmission Fluid XT-2-QDX	MERCON
Pipe Sealant with Teflon® D8AZ-19554-A or equivalent	WSK-M2G350-A2
Premium Long Life Grease XG-1-C, K or T or equivalent	ESA-M1C75-B

1. **NOTE:** Before installing the transmission, the ball stud, clutch release lever and the input shaft must be cleaned and lubricated. Use Motorcraft Premium Long-Life Grease XG-1-C or XG-1-K or equivalent meeting Ford specification ESA-M1C75-B.

   To install, reverse the removal procedure. For additional information, refer to Transmission in this section.

   - Check, and as necessary, fill the transmission with transmission fluid. The total fill capacity is 3.6L (7.5 pt).

2. Apply sealant to the fill plug threads and install the fill plug.
   - Use pipe sealant with Teflon®.